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ABSTRACT

This report documents the design, administration, and data analysis procedure of the National Assessment of Education Progress (NAEP) for 1996. It indicates the technical decisions that were made and the rationale behind them. Detailed substantive findings are not presented in this report. These chapters provide technical information about the NAEP: (1) "Overview of Part I: The Design and Implementation of the 1996 NAEP" (Nancy L. Allen and Eugene G. Johnson); (2) "Developing the NAEP Objectives, Items, and Background Questions for the 1996 Assessments of Mathematics and Science" (Stephen Lazer); (3) "Sample Design" (Leslie Wallace and Keith F. Rust); (4) "Assessment Instruments" (Stephen Lazer); (5) "Field Operations and Data Collection" (Lucy M. Gray, Mark M. Waksberg, and Nancy W. Caldwell); (6) "Processing Assessment Materials" (Patrick B. Bourgeacq, Bradley Thayer, and Timothy Robinson); (7) "Professional Scoring" (Patrick B. Bourgeacq, Bradley Thayer, and Timothy Robinson); (8) "Creation of the Database, Quality Control of the Data Entry, and Creation of the Database Products" (John J. Ferris, Katharine E. Pashley, David S. Freund, and Alfred M. Rogers); (9) "Overview of Part II: The Analysis of 1996 NAEP Data" (Nancy L. Allen and James E. Carlson); (10) "Weighting Procedures and Estimation of Sampling Variance" (Eugene G. Johnson, Jiahe Qian, Leslie Wallace, and Keith F. Rust); (11) "Scaling Procedures" (Nancy L. Allen, Eugene G. Johnson, Robert J. Mislevy, and Neal Thomas); (12) "Data Analysis for the Mathematics Assessment" (Frank Jenkins, Hua-Hua Chang, and Edward Kulick); (13) "Data Analysis for the Science Assessment" (John R. Donoghue, Jinming Zhang, Steven P. Isham, Lois H. Worthington, and Ingeborg U. Novatkoski); (14) "Data Analysis for the Long-Term Trend Reading Assessment" (Jo-Lin Liang and Lois H. Worthington); (15) "Data Analysis for the Long-Term Trend Mathematics Assessment" (Jiahe Qian and Norma A. Norris); (16) "Data Analysis for the Long-Term Trend Science Assessment" (Jinming Zhang and Norma A. Norris); (17) "Data Analysis for the Long-Term Trend Writing Assessment" (Eiji Muraki and Bruce A. Kaplan); (18) "Conventions Used in Hypothesis Testing and Reporting NAEP Results" (Spencer S. Swinton, David S. Freund, and Nancy L. Allen); and (19) "Statistical Summary of the 1996 NAEP Samples" (Bruce A. Kaplan). Eleven appendixes contain supplemental information related to statistical analysis. (Contains 176 tables in the text, 106 tables in the appendixes, 26 figures, and 121 references.) (SLD)

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The NAEP 1996 Technical Report

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THE NATION'S REPORT CARD, the National Assessment of Educational Progress (NAEP), is the only nationally representative and continuing assessment of what America's students know and can do in various subject areas. Since 1969, assessments have been conducted periodically in reading, mathematics, science, writing, history, geography, and other fields. By making objective information on student performance available to policymakers at the national, state, and local levels, NAEP is an integral part of our nation's evaluation of the condition and progress of education. Only information related to academic achievement is collected under this program. NAEP guarantees the privacy of individual students and their families.

NAEP is a congressionally mandated project of the National Center for Education Statistics, the U.S. Department of Education. The Commissioner of Education Statistics is responsible, by law, for carrying out the NAEP project through competitive awards to qualified organizations. NAEP reports directly to the Commissioner, who is also responsible for providing continuing reviews, including validation studies and solicitation of public comment, on NAEP's conduct and usefulness.

In 1988, Congress established the National Assessment Governing Board (NAGB) to formulate policy guidelines for NAEP. The Board is responsible for selecting the subject areas to be assessed from among those included in the National Education Goals; for setting appropriate student performance levels; for developing assessment objectives and test specifications through a national consensus approach; for designing the assessment methodology; for developing guidelines for reporting and disseminating NAEP results; for developing standards and procedures for interstate, regional, and national comparisons; for determining the appropriateness of test items and ensuring they are free from bias; and for taking actions to improve the form and use of the National Assessment.

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THE NAEP 1996 TECHNICAL REPORT

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July 1999

THE NAEP 1996 TECHNICAL REPORT

Introduction[1]

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The 1996 National Assessment of Educational Progress (NAEP) monitored the performance of students in American schools in the subject areas of reading, mathematics, science, and writing. The national sample involved nearly 124,000 public and nonpublic-school students who were 9-, 13-, or 17 years old or in grades 4, 8, or 12.

The purpose of this technical report is to provide details on the instrument development, sample design, data collection, and data analysis procedures of the 1996 assessment. Detailed substantive results are not presented here but can be found in a series of NAEP reports on the status of and trends in student performance; several additional reports provide information on how the assessment was designed and implemented. The reader is directed to the following reports for 1996 results and supporting documentation:

- *NAEP 1996 Mathematics Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress* (Reese, Miller, Mazzeo, & Dossey, 1997)
- *NAEP 1996 Science Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress* (O'Sullivan, Reese, & Mazzeo, 1997)
- *The NAEP Guide: A Description of the Content and Methods of the 1994 and 1996 Assessments* (NAEP, 1996)
- *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997)
- *NAEP 1996 Mathematics Cross-State Data Compendium for the Grade 4 and Grade 8 Assessment* (Shaughnessy, Nelson, & Norris, 1997)
- *NAEP 1996 Science Cross-State Data Compendium for the Grade 8 Assessment* (Keiser, Nelson, Norris, & Szyszkiewicz, 1998)
- *Mathematics Framework for the 1996 National Assessment of Educational Progress* (National Assessment Governing Board, 1994)
- *Science Framework for the 1996 National Assessment of Educational Progress* (National Assessment Governing Board, 1993)

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[1] James E. Carlson is responsible for psychometric and statistical analyses of NAEP.

- *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* (Allen, Jenkins, Kulick, & Zelenak, 1997)

- *Technical Report of the NAEP 1996 State Assessment Program in Science* (Allen, Swinton, Isham, & Zelenak, 1998)

- *NAEP 1996 National Assessment Secondary-Use Data Files User Guide* (Rogers, Kline, & Schoeps, 1999)

- *NAEP 1996 State Assessment Program in Mathematics Secondary-Use Data Files User Guide* (O'Reilly, Zelenak, Rogers, & Kline, 1999)

- *NAEP 1996 State Assessment Program in Science Secondary-Use Data Files User Guide* (O'Reilly, Zelenak, Rogers, & Kline, 1999)

- *NAEP 1996 Science Performance Standards: Achievement Results for the Nation and the States* (Bourque, Champagne, & Crissman, 1997)

- *School Policies Affecting Instruction in Mathematics: Findings from the National Assessment of Educational Progress* (Hawkins, Stancavage, & Dossey, 1998)

- *Student Work and Teacher Practices in Mathematics* (Mitchell, Hawkins, Jakwerth, Stancavage, & Dossey, 1999)

- *Estimation Skills, Mathematics-in-context, and Advanced Skills in Mathematics* (Hawkins, Mitchell, Stancavage, & Dossey, 1999)

- *Students Learning Science: A Report on Policies and Practices in U.S. Schools* (O'Sullivan, Weiss, & Askew, 1998)

- *Student Work and Teacher Practices in Science: A Report on What Students Know and Can Do* (O'Sullivan & Weiss, 1999)

- *The 1996 NAEP Sampling and Weighting Report* (Wallace & Rust, 1999)

- *Report on Data Collection Activities for the 1996 National Assessment of Educational Progress* (Westat, Inc., 1996)

- *Report of Processing and Professional Activities* (National Computer Systems, 1996)

The *Report Card* publications highlight results for the nation, states, and selected subgroups. Reports on student work and teacher practices focus on instructional variables related to mathematics and science education and are designed to meet the information needs of teachers and curriculum specialists. The aim of the reports on school policies, which focus on instruction-relevant variables from the school or community level, is to meet the information needs of principals, school boards, and interested citizens. Technical and other reports listed above provide more detailed information on the NAEP data and analysis procedures. Many of the NAEP reports, including the almanacs (summary data tables), are also available on the Internet at *http://nces.ed.gov/naep*. For ordering information on printed copies of these reports, go to the Department of Education web page *http://www.ed.gov/pubs/edpubs.html*, call toll free 1–877– 4ED PUBS (877–433–7827), or write to:

Education Publications Center (ED Pubs)
U.S. Department of Education
P.O. Box 1398
Jessup, MD 20794–1398

The *Frameworks* are designed to assess the outcomes of students' education in mathematics and science in grade 4, 8, and 12 as part of NAEP. For ordering information on these reports, write:

National Assessment Governing Board
800 North Capitol Street NW
Suite 825
Washington, DC 20002

The *Frameworks* and other NAGB documents are also available through the web at *http://www.nagb.org*.

Additional samples of approximately 125,000 fourth- and 125,000 eighth-graders in 48 jurisdictions were assessed in the 1996 state assessment in mathematics. Also a sample of approximately 125,000 fourth-graders in 47 states and jurisdictions was assessed as part of the 1996 state assessment in science. A representative sample of about 2,500 students was selected in each jurisdiction for each subject at each grade level. The state-level sampling plan allowed for cross-state comparisons and comparisons with the nation in fourth-grade science and fourth- and eighth-grade mathematics achievement. Technical details of the state assessments are not presented in this technical report but can be found in the state technical reports.

AN OVERVIEW OF NAEP IN 1996

For the 1996 assessment, NAEP researchers continued to build on the original design technology outlined in *A New Design for a New Era* (Messick, Beaton, & Lord, 1983). In order to maintain its links to the past and still implement innovations in measurement technology, NAEP continued its multistage sampling approach. Long-term trend and short-term trend samples use the same methodology and population definitions as in previous assessments. Main assessment samples use innovations associated with new NAEP technology and address current educational issues. Long-term trend data are used to estimate changes in performance from previous assessments; main assessment sample data are used primarily for analyses involving the current student population, but also to estimate short-term trends for a small number of recent assessments. In continuing to use this two-tiered approach, NAEP reaffirms its commitment to maintaining long-term trends while at the same time implementing the latest in measurement technology.

A major new design feature was introduced for 1996 to permit the introduction of new inclusion rules for students with disabilities (SD) and limited English proficient (LEP) students, and the introduction of testing accommodations for those students. The 1996 national NAEP incorporated a multiple sampling plan that allowed for the study of changes in NAEP inclusion and accommodation procedures. In order to provide for studies of the effects of these changes, students from different samples were administered the NAEP instruments using different sets of inclusion rules and accommodation procedures. Testing accommodations were provided for SD and LEP students in certain samples who could be assessed, but not with standard instruments or administration procedures.

In the 1996 assessment, many of the innovations that were implemented for the first time in 1988 were continued and enhanced. For example, a variant of the focused balanced incomplete block (focused-BIB) booklet design that was used in 1988 and has continued to be used in other assessment years, was used in the 1996 main assessment samples in mathematics and science. In the focused-BIB design, an individual receives blocks of cognitive items in the same subject area. The focused-BIB design allows for improved estimation within a particular subject area, and estimation continues to be optimized for groups rather than individuals.

In 1996, NAEP continued to apply the plausible values approach to estimating means for demographic as well as curriculum-related subgroups. Proficiency estimates were based on draws from a posterior distribution that was based on an optimum weighting of two sets of information: the student's responses to cognitive items, and his or her demographic and associated educational process variables. This Bayesian procedure was developed by Mislevy (see Chapter 11 or Mislevy, 1991). The 1996 procedures continued to use an improvement that was implemented first in 1988 and refined for the 1994 assessment. This is a multivariate procedure that uses information from all scales within a given subject area in the estimation of the proficiency distribution on any one scale in that subject area.

A major improvement used in the 1992 and 1994 assessments, and continued in 1996, was the use of the generalized partial credit model for item response theory (IRT) scaling. This allowed the incorporation of constructed-response questions that are scored on a multipoint rating scale into the NAEP scale in a way that utilizes the information available in each response category.

One important innovation in reporting the 1990 assessment data that was continued through 1996 was the use of simultaneous comparison procedures in carrying out significance tests for the differences across assessment years. Methods such as the Bonferroni allow one to control for the type I error rate for a fixed number of comparisons. In 1996, a new procedure that provided more powerful procedures that control for the false discovery rate were implemented for some comparisons. Tests for linear and quadratic trends were also applied to the national trend data in reading, mathematics, science, and writing.

ORGANIZATION OF THE TECHNICAL REPORT

Part I of this report presents the details of the design of the 1996 National Assessment, summarized in Chapter 1. Chapters 2 through 8 describe the development of the objectives and the items used in the assessment, the sample selection procedures, the assessment booklets and questionnaires, the administration of the assessment in the field, the processing of the data from the assessment instruments into computer-readable form, the professional scoring of constructed-response items, and the methods used to create a complete NAEP database.

The 1996 NAEP data analysis procedures are described in Part II of the report. Chapter 9 provides a summary of the analysis steps. Subsequent chapters provide a general discussion of the weighting and variance estimation procedures used in NAEP, an overview of NAEP scaling methodology, and details of the trend and main assessment analyses performed for each subject area in the 1996 assessment.

Chapter 19 presents basic data from the 1996 assessment, including the properties of the measuring instruments and characteristics of the sample.

Chapter 1

OVERVIEW OF PART I: THE DESIGN AND IMPLEMENTATION OF THE 1996 NAEP[1]

Nancy L. Allen and Eugene G. Johnson
Educational Testing Service

1.1 INTRODUCTION

The 1996 National Assessment collected information on the knowledge, skills, and attitudes of young Americans in mathematics, science, reading, and writing. The three components of the National Assessment were the main assessments of mathematics and science, the long-term trend assessments of mathematics, science, reading, and writing, and special assessments of aspects of mathematics and science. The basis for the information collected for the National Assessment was a complex sample survey involving nearly 124,000 students, consisting of national samples of public- and nonpublic-school students who were in grades 4, 8, and 12 or were 9-, 13-, or 17-year olds. Additional NAEP data came from the State Assessment program, which in 1996 assessed mathematics at grades 4 and 8 in representative samples of public- and nonpublic-school students in 44 states, the District of Columbia, Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS), Department of Defense Dependents Schools (DoDDS), and Guam. The 1996 State Assessment program also assessed science at grade 8 in representative samples of public- and nonpublic-school students in 43 states, the District of Columbia, DDESS, DoDDS, and Guam; DDESS and DoDDS fourth-grade students were assessed as part of a separate special science assessment.

This chapter describes the design for the 1996 assessment and gives an overview of the steps involved in its implementation, from the planning stage through the creation of edited data files. The major components of the implementation are presented here with references to other chapters in Part I that provide greater detail on each aspect of the assessment. The procedures used for the analysis of the data are summarized in the overview to Part II and discussed in detail in the remaining chapters in that part of the report. Excluded from this technical report are the details of the design and analysis of the 1996 State Assessments, which instead appear in the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* (Allen, Jenkins, Kulick, & Zelenak, 1997), and in the *Technical Report of the NAEP 1996 State Assessment Program in Science* (Allen, Swinton, Isham, & Zelenak, 1998). Also excluded are the details of the analyses of special studies of advanced mathematics and science students and of students receiving special theme-related and estimation mathematics items. The analyses will be described in the appendices of the reports containing the results of these special studies.

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[1] Nancy L. Allen is responsible for the psychometric and statistical analysis of national and state NAEP data. Eugene G. Johnson is a senior psychometrician, contributing to the design of NAEP and to discussions of sampling issues. Previously, he was responsible for the psychometric and statistical analysis of NAEP data. The authors are indebted to the authors of Chapters 2 through 8 for portions of this chapter.

The organization of this chapter, and of Part I, is as follows:

- Section 1.2 provides an overview of the NAEP design for 1996 and includes a description of the constituent samples. To provide background information, the section also includes the assessment schedule from the inception of NAEP in 1969 through the 1996 assessment.
- Section 1.3 provides a summary of the development of the objectives for each subject area in the assessment and a description of the development and review of the items written to fit those objectives. Details of the objective and item development processes appear in Chapter 2.
- Section 1.4 provides a summary of the sampling design used for the 1996 assessment with a fuller description provided in Chapter 3.
- Section 1.5 includes a discussion of the assignment of the cognitive and background questions to assessment booklets and a description of the complex block designs that were the basis for assigning cognitive items to assessment booklets and assessment booklets to individuals. Chapter 4 provides a detailed description of the assessment booklets.
- Section 1.6 provides a summary of the field administration procedures, including the processes of training field administrators, attaining school cooperation, administering the assessment, and conducting quality control. Further details appear in Chapter 5.
- Section 1.7 includes a description of the flow of data from the receipt of the assessment materials through data entry, validation, and resolution to the creation of edited data files. Chapter 6 provides a detailed description of the process.
- Section 1.8 contains a discussion of the professional scoring of students' responses to the constructed-response items in the assessment. Details of the process are given in Chapter 7.
- Section 1.9 provides a summary of the creation of the database, the quality control of data entry, and lists the 1996 database products. This section also includes a description of the use of the World Wide Web for dissemination of NAEP information. Further details appear in Chapter 8.

1.2 THE 1996 NAEP DESIGN

A major purpose of NAEP is the reliable measurement of trends in educational achievement over time. To do this well, confounding effects due to changes from one assessment to the next in assessment instrumentation or in assessment procedures must be minimized. This implies a stability in the measurement process over time. At the same time, the assessment must remain current by allowing the introduction of new curriculum concepts and changes in educational priorities and by permitting the use of new measurement technology. The objectives for an assessment are determined through a consensus process in which committees of subject matter experts, scholars, and citizens representing many diverse constituencies and points of view are assembled to determine the educational goals that students should achieve. Satisfying these objectives often requires changes in assessment instrumentation and methodology.

In order to meet the goals of measuring trends reliably and responding to changes in the current thinking about subject areas, NAEP has instituted a multicomponent assessment system where each component is itself a set of assessments designed to accomplish a specific goal. There are three components in the 1996 National Assessment design: (1) main assessments; (2) assessments for long-term trend; and (3) special assessments. In particular, the main assessments respond to changes in curriculum on a regular basis, while the long-term trend assessments are not changed and measure longer-term trends in a valid way. These are discussed in detail in this chapter.

Several improvements were made in the design of NAEP in the 1984 and succeeding assessments. Until the 1984 assessment, NAEP was administered using matrix sampling and tape recorders; that is, by administering booklets of exercises using an aurally presented stimulus that paced groups of students through the individual assessment exercises in a common booklet. In the 1984 assessment, BIB spiraling, which does not include aural pacing, was introduced in place of taped matrix sampling. The NAEP design now includes sampling grade populations as well as the age populations that NAEP originally assessed. The definitions of student age and the time of year in which the assessment takes place have been made uniform so that students in the fourth-, eighth-, and twelfth-grades are assessed. To shorten the timetable for reporting results, the period for national data collection was decreased in 1992, 1994, and 1996 from the five-month period used in 1990 to a three-month period in the winter (corresponding to the period used for the winter half-sample of the 1990 National Assessment). To enhance the coverage of the subject areas assessed, the number of items measuring knowledge and skills was increased for the 1992, 1994, and 1996 assessments.

A special feature of the 1996 main and state assessments was the introduction of new rules for inclusion of students with disabilities (SD) and limited English proficient (LEP) students in NAEP assessments (presented in Chapter 5). A subsample of the schools selected for participation in the 1996 assessments used the old inclusion rules (sample type 1; S1) to determine whether students should be included in the assessment and another subsample used the new inclusion rules (sample type 2; S2). In addition to the two groups of schools using the old and new inclusion rules without offering students special testing accommodations, the 1996 main assessments included a third group of schools that used the new inclusion rules and offered students within those schools accommodations to the standard NAEP administration procedures (sample type 3; S3). Figure 1-1 contains the layout of the pieces of the sample collected for each grade of the main assessment of mathematics.

The accommodations provided by NAEP in the main assessments were meant to match those specified in the student's individualized education program (IEP) or those ordinarily provided in the classroom for testing situations. The most common accommodation was extended time. The samples of students from the third group of schools that used the new inclusion rules and offered students accommodations were not included for most analysis and reporting purposes, although the results for these samples were studied in follow-up analyses. In the State Assessments, no special accommodations were offered. The information in Chapters 3 and 5 applies to schools and students in all of the sample types, while the data analysis chapters reflect schools and students in reporting samples only.

The new inclusion rules are applied only when a student has been categorized in his or her IEP as a student with disabilities (SD) or as a limited English proficient (LEP) student; all other students were asked to participate in the assessment. For this reason, the sample of students that was selected for most analysis and reporting purposes for the main mathematics assessment consisted of students from two

Figure 1-1

Subsamples of the Mathematics Assessment: 1996

GROUPS OF STUDENTS	GROUPS OF SCHOOLS		
	Sample Type 1 **OLD INCLUSION RULES** **- NO ACCOMMODATIONS -**	**Sample Type 2** **NEW INCLUSION RULES** **- NO ACCOMMODATIONS -**	**Sample Type 3** **NEW INCLUSION RULES** **- ACCOMMODATIONS**
NOT SD/LEP[1]	A_1	A_2	A_3^2
INCLUDED SD/LEP[1]	B_1	B_2^2	B_3^2
EXCLUDED SD/LEP[1]	C_1^3	C_2^3	C_3^3

[1] Students with Disabilities/Limited English Proficient

[2] Results for students in subsamples B_2, A_3, and B_3 were not reported in *NAEP 1996 Mathematics: Report Card for the Nation and the States*.

[3] Students in subsamples C_1, C_2, and C_3 were not included in the assessment.

groups: those who were not categorized as SD or LEP students and who were from schools providing no accommodations and used either set of inclusion rules (A_1 and A_2 in Figure 1-1); and those who were categorized as SD or LEP students and who were from schools providing no accommodations and using only the old inclusion rules (B_1 in Figure 1-1). The advantage of this reporting sample is that it preserves trend with previous assessments and it makes use of most of the data from the assessment. The main science assessment sample did not include students from schools using the old inclusion rules. The sample of students that was selected for most analysis and reporting purposes for the main science assessment consisted of students from the schools using new inclusion rules, but not providing any accommodations (A_2 and B_2 in Figure 1-1). The advantage of this reporting sample is that it makes use of the most up-to-date inclusion rules and begins a science trend line.

Special analyses that used the national science and mathematics assessment data to compare the old and new inclusion rules and examine the effect of offering testing accommodations indicated little difference in proportions of students included in the assessment. More students were included in the assessment when they were offered accommodations; however, a portion of students who would have participated in the assessment under standard conditions was assessed with accommodations when they were offered. A result of this is that fewer students were assessed under standard conditions when accommodations were offered. The students from the schools offering accommodations were not included in the analyses or results contributing to the Mathematics or Science Report Cards, so they did not affect the measurement of the 1990, 1992, and 1996 trend for mathematics. The results from the science assessment were not compared to those from previous assessments.

NAEP's design for 1996 required collecting 24 different samples in order to conduct the assessments. The various samples collected and reported for the 1996 assessment are summarized in Table 1-1.

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Table 1-1

NAEP 1996 Student Samples

Sample	Booklet IDs	Mode	Cohort Assessed	Time of Testing[1]	Age Definition	Modal Grade	Reporting Sample Size[2]
9[Math Main]	101-129, 921	Print	Grade 4	1/3/96 - 3/29/96			6,627
13[Math Main]	101-130, 921	Print	Grade 8	1/3/96 - 3/29/96			7,146
17[Math Main]	101-130	Print	Grade 12	1/3/96 - 3/29/96			6,904
4 [Math-Estimation]	127	Tape	Grade 4	1/3/96 - 3/29/96			2,023
8 [Math-Estimation]	127	Tape	Grade 8	1/3/96 - 3/29/96			2,183
12 [Math-Estimation]	127	Tape	Grade 12	1/3/96 - 3/29/96			1,849
4 [Math-Theme]	128, 129	Print	Grade 4	1/3/96 - 3/29/96			3,790
8 [Math-Theme]	128, 129	Print	Grade 8	1/3/96 - 3/29/96			4,027
12 [Math-Theme]	128, 129	Print	Grade 12	1/3/96 - 3/29/96			3,735
8 [Math-Advanced]	130	Print	Grade 8	1/3/96 - 3/29/96			2,337
12 [Math-Advanced]	130	Print	Grade 12	1/3/96 - 3/29/96			2,965
9 [Science Main]	201-237	Print	Grade 4	1/3/96 - 3/29/96			7,305
13 [Science Main]	201-237	Print	Grade 8	1/3/96 - 3/29/96			7,774
17 [Science Main]	201-240	Print	Grade 12	1/3/96 - 3/29/96			7,537
12 [Sci-Advanced]	238-240	Print	Grade 12	1/3/96 - 3/29/96			2,431
13 [Sci-State]	201-237	Print	Grade 8	1/29/96 - 3/4/96			*[3]
9 [MS-LTTrend]	91 – 93	Tape	Age 9	1/3/96 - 3/8/96	CY	4	5,414
13 [MS-LTTrend]	91 – 93	Tape	Age 13	10/9/95 - 12/22/95	CY	8	5,658
17 [MS-LTTrend]	84 – 85	Tape	Age 17	3/11/96 - 5/10/96	Not CY	11	3,539

[1] Final makeup sessions for the winter session (January 3-March 29, 1996) were held April 1-5, 1996.

[2] The total number of students assessed in the reporting sample of the national assessment was 43,293 for the main assessment, 29,792 for the long-term trend assessment, and 25,340 for the special studies.

[3] Note: consists of distinct samples in 48 jurisdictions

LEGEND:				
	Math	Mathematics	Main	Main assessment, print administration
	Sci	Science	LTTrend	Long-term trend assessment
	RW	Reading and writing	CY	Calendar year: birthdates in 1986 and 1982 respectively for ages 9 and 13
	MS	Mathematics and science		
	Print	Print administration	Not CY	Age 17 only: birthdates between October 1, 1978 and September 30, 1979
	Tape	Audiotape administration		

Each row of Table 1-1 corresponds to a particular sample and each column of the table indicates the following major features of that sample:

1. *Sample* is the sample identifier. The first part of the sample code is a number (the age class) representing the student cohort included in the sample (note that this part of the code does not indicate whether an age or grade sample was selected); the second part, in brackets, denotes the specific sample type. For example, 9[Math Main] is a main assessment mathematics sample for grade 4, assessed in print mode. A full description of the purposes for the various sample types is given below.

2. *Booklets* gives the identifier numbers for the booklets used for the assessment of the particular sample.

3. *Mode* indicates the mode of assessment, which may be print or tape. NAEP originally assessed students using a tape recorder in addition to booklets, thus pacing the students through exercises at a fixed rate. In 1996, NAEP used a paced audiotape for its mathematics and science long-term trend assessments. However, most other assessments in 1996 used printed instructions with the student expected to read the exercises. The only other exception was the 1996 assessment of mathematics estimation skills.

4. The *cohort assessed* denotes the age, grade, or age/grade of the population being sampled. For example, *grade 4* represents students who are in the fourth grade; an *age 17* cohort consists of students (in any grade) who are 17 years old. Samples for the 1996 main assessments were selected on the basis of grade only. The traditional NAEP samples used in long-term trend estimation were defined by age only. However, the 1996 reading and writing long-term trend assessments were defined by being either of a particular age *or* of the modal grade for students of that age. For reading and writing, results are reported for grade and age samples, respectively. The definitions of age, and thus the corresponding grade, have changed in ways that are described in Section 1.2.1.

5. *Time of testing* indicates the time of year in which the assessment is performed. NAEP traditionally assessed 9-year-olds in the winter, 13-year-olds in the fall, and 17-year-olds in the spring; like the 1994 main assessment, in 1996, all grades were assessed in the winter (between January 3-March 29, 1996; final makeup sessions were held April 1-5, 1996).

6. *Age definition* is denoted as calendar year (CY) or not calendar year (Not CY). NAEP originally defined age by birth within a calendar year at ages 9 and 13 but defined age 17 as being born between October 1 of one year and September 30 of the next. In the 1996 main assessments, no students were selected on the basis of their age.

7. The *modal grade* is the grade attended by most of the students of the sampled age. For example, if an age 17 sample is listed as having a modal grade of 11, then most of the 17-year-old students, as defined, are in the eleventh grade. The definition of age affects the modal grade of the sample. All students sampled for the 1996 main assessments were in the grade defined by the cohort assessed.
8. The *reporting sample size* is the number of students in the sample who were actually administered the assessment and whose results were used in the NAEP subject-area reports.

1.2.1 The 1996 NAEP Samples

The NAEP samples in 1996 consisted of four types: the samples from the National Assessment—the main NAEP samples, the long-term trend samples, and the special studies samples—and the State Assessment samples.

The Main NAEP Samples. The main NAEP samples are labeled in Table 1-1 as [Math Main] and [Science Main]. The samples used complex spiraling procedures (defined in Section 1.5), and were intended to form the basis for future assessments. Each sample was assessed in the winter period (January 3 through March 29, 1996). In these samples, only grade populations were sampled, although age/grade populations were assessed in previous assessment years. The main NAEP samples, and their purposes, are as follows:

> [Math Main] are grades 4, 8, and 12 mathematics assessment samples used for measuring mathematics achievement in 1996. The fourth- and eighth-grade samples also provided the comparison groups for the 1996 State Assessment of mathematics in grades 4 and 8. These samples used print administration.
>
> [Science Main] are grades 4, 8, and 12 science assessment samples used for measuring science achievement in 1996. The eighth-grade samples also provided the comparison groups for the 1996 State Assessment in science in grade 8. These samples used print administration.

The Long-Term Trend Samples. The long-term trend samples are labeled as [RW-LTTrend] and [MS-LTTrend] in Table 1-1. Each sample was defined in the same way as equivalent samples in previous assessments and used the same assessment technology as was used in those assessments. Therefore, the long-term trend samples are directly comparable to those from previous assessments and so can be used for continuing the NAEP long-term trend lines. Because these samples were designed to link the 1996 data with data from previous assessments, they are also referred to as bridge samples. The long-term trend samples and their purposes are as follows:

> [RW-LTTrend] are age/grade samples used for estimating long-term trends in reading and writing. These samples used assessment booklets identical to those initially used in 1984 and subsequently used in 1988, 1990, 1992, and 1994 (many of the items were also used in pre-1984 assessments). As in 1984, 1988, 1990, 1992, and 1994, print administration was used. These samples used the age definitions and time of testing originally used by NAEP in the 1970s and the early 1980s. The estimates of reading achievement from these samples link to eight previous reading assessments (1971, 1975, 1980, 1984, 1988, 1990, 1992, and 1994); the estimates of writing achievement link to five previous writing assessments (1984, 1988, 1990, 1992, and 1994).
>
> [MS-LTTrend] are age-only samples used for estimating long-term trends in mathematics and science achievement. These samples used the same age definitions and time of testing as were used since 1969 and used the same assessment instruments as were used in the 1986, 1990, 1992, and 1994 long-term trend assessments of mathematics and science. As in previous assessments, the administration of the mathematics and science questions was paced with an audiotape. The estimates of science achievement from these samples link to eight previous science assessments (1970, 1973, 1977, 1982, 1986, 1990, 1992, and 1994); the estimates of mathematics achievement link to seven previous assessments (1973, 1978, 1982, 1986, 1990, 1992, and 1994).

The Special Studies Samples. Three sets of samples were collected as part of special NAEP studies. The samples used special innovative procedures to allow the study of specific aspects of mathematics and science. Each sample was assessed in the winter period (January 3 through March 29, 1996). In these samples, only grade populations were sampled. The special studies samples, and their purposes, are as follows:

> [Math-Estimation] are samples of specially selected students in grades 4, 8, and 12 who were administered mathematics estimation booklets in separate paced-tape sessions. The students are representative of the fourth-, eighth-, and twelfth-grade students in the nation.

[Math-Theme] are samples of specially selected students in grades 4, 8, and 12 who were administered mathematics theme booklets. These samples were assessed in print administrations. The students were selected to represent the national populations of fourth-, eighth-, and twelfth-grade students. The students in these samples were assessed in separate sessions.

[Math-Advanced] and [Sci-Advanced] are samples of specially selected students in grade 8 (for mathematics only) and grade 12 (for mathematics and science) who received advanced mathematics and science booklets. They were assessed in separate sessions. The students were selected from students who were taking advanced courses in mathematics or science.

The State Assessment Samples. In Table 1-1, 9[Math-State], 13[Math-State], and 13[Sci-State] are samples of fourth- and eighth-grade public- and nonpublic-school students from each of the states and jurisdictions participating in the 1996 State Assessment of mathematics, and eighth-grade public- and nonpublic-school students from each of the states and jurisdictions participating in the 1996 State Assessments of science.[2] The assessment booklets were the same print-administered booklets as those used for the matching samples 9[Math Main], 13[Math Main], and 13[Science Main] but the administrative procedures varied from that of the national assessment in that state personnel collected the data.

1.2.2 NAEP Assessments Since 1969

Table 1-2 shows the subject areas, grades, and ages assessed since the NAEP project began in 1969. As can be seen, in addition to the 1996 subject areas of mathematics, science, reading, and writing, several other subject areas have been assessed over the years—social studies, U.S. history, civics, citizenship, geography, literature, music, career development, art, and computer competence. Many subject areas are reassessed periodically to measure trends over time.

Assessments were conducted annually through 1980, but budget restrictions since then have reduced data collection to a biennial basis. Since its inception, NAEP has assessed 9-year-olds, 13-year-olds, and in-school 17-year-olds, although the age definitions changed in 1986 and again in 1988. Because of budget restrictions, NAEP no longer routinely assesses out-of-school 17-year-olds or young adults. (A separate assessment of young adults of ages 21 to 25 was conducted in 1985 under a separate grant.)

The table also indicates that in 1984, NAEP began gathering data by grade as well as by age, a practice that had been continued in assessments up to 1994; the 1996 national assessment included gathered data by grade only. It should be noted that somewhat different age definitions were used in the 1984, 1986, and 1988 assessments. In the 1984 assessment, the two younger ages were defined on a calendar-year basis, while the 17-year-olds were defined on an October 1 to September 30 basis. This resulted in modal grades of 4, 8, and 11. To allow for age cohorts that were exactly four years apart, in the 1986 main assessment all ages were defined on an October 1 to September 30 basis, resulting in modal grades of 3, 7, and 11. Special studies (Kaplan, Beaton, Johnson, & Johnson, 1988) were conducted to measure the effect of the changes in age definition. Because of problems encountered in assessing third graders, in 1988 the ages were redefined on a calendar-year basis, with the modal grades being 4, 8, and 12. These were the age definitions used in the 1990, 1992, and 1994 main assessments.

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[2] Fourth-grade students in DDESS and DoDDS schools were assessed as a separate special science assessment.

Table 1-2

National Assessment of Educational Progress
Subject Areas, Grades, and Ages Assessed: 1969-1996

		Grades/Ages Assessed										
Assessment Year	**Subject Area(s)**	**Grade 3**	**Grade 4**	**Age 9**	**Grade 7**	**Grade 8**	**Age 13**	**Grade 11**	**Grade 12**	**Age 17**	**Age 17OS[1]**	**Adult**
1969-70	Science			X			X			X	X	X
	Writing			X			X			X	X	X
	Citizenship			X			X			X	X	X
1970-71	Reading			X			X			X	X	X
	Literature			X			X			X	X	X
1971-72	Music			X			X			X	X	X
	Social Studies			X			X			X	X	X
1972-73	Science			X			X			X	X	X
	Mathematics			X			X			X	X	X
1973-74	Career and Occupational Development			X			X			X	X	X
	Writing			X			X			X	X	
1974-75	Reading			X			X			X	X	
	Art			X			X			X	X	
	Index of Basic Skills									X	X	
1975-76	Citizenship/Social Studies			X			X			X	X	
1976-77	Science			X			X			X		
	Basic Life Skills[2]									X		
	Sci/ RD / Energy / Health[2]											X
1977-78	Mathematics			X			X			X		
	Consumer Skills[2]									X		
1978-79	Writing, Art, and Music			X			X			X		
1979-80	Reading/Literature			X			X			X	X	
	Art						X					
1981-82	Science[2]			X			X			X		
	Mathematics and Citizenship/Social Studies			X			X			X		
1984	Reading		X	X		X	X	X		X		
	Writing		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
1985	Adult Literacy[2]											X
1986	Reading	X		X	X		X	X		X		
	Mathematics	X		X	X		X	X		X		
	Science	X		X	X		X	X		X		
	Computer Competence	X		X	X		X	X		X		
	U.S. History[2]							X		X		
	Literature[2]							X		X		
	Reading (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)		X	X		X	X	X		X		
	Science (long-term trend)		X	X		X	X	X		X		

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[1] *Age 17 students who had dropped out of school or had graduated prior to assessment.*

[2] *Small, special-interest assessment conducted on limited samples at specific grades or ages.*

(continued)

Table 1-2 (continued)

National Assessment of Educational Progress
Subject Areas, Grades, and Ages Assessed: 1969-1996

		Grades/Ages Assessed										
Assessment Year[3]	**Subject Area(s)**	**Grade 3**	**Grade 4**	**Age 9**	**Grade 7**	**Grade 8**	**Age 13**	**Grade 11**	**Grade 12**	**Age 17**	**Age 17OS[1]**	**Adult**
1988	Reading		X	X		X	X		X	X		
	Writing		X	X		X	X		X	X		
	Civics		X	X		X	X		X	X		
	U.S. History		X	X		X	X		X	X		
	Document Literacy[2]		X	X		X	X		X	X		
	Geography[2]		X	X		X	X		X	X		
	Reading (long-term trend)		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)			X			X	X		X		
	Science (long-term trend)			X			X	X		X		
	Civics (long-term trend)						X			X		
1990	Reading		X	X		X	X		X	X		
	Mathematics		X	X		X	X		X	X		
	Science		X	X		X	X		X	X		
	Reading (long-term trend)		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)			X			X			X		
	Science (long-term trend)			X			X			X		
	Trial State Mathematics					X						
1992	Reading		X	X		X	X		X	X		
	Writing		X	X		X	X		X	X		
	Mathematics		X	X		X	X		X	X		
	Reading (long-term trend)		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)			X			X			X		
	Science (long-term trend)			X			X			X		
	Trial State Mathematics		X			X						
	Trial State Reading		X									
1994	Reading		X	X		X	X		X	X		
	U.S. History		X	X		X	X		X	X		
	Geography		X	X		X	X		X	X		
	Reading (long-term trend)		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)			X			X			X		
	Science (long-term trend)			X			X			X		
	Trial State Reading		X									

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[1] *Age 17 students who had dropped out of school or had graduated prior to assessment.*

[2] *Small, special-interest assessment conducted on limited samples at specific grades or ages.*

[3] *It should be noted that somewhat different age definitions were used in the 1984, 1986, and 1988 assessments. In the 1984 assessment, the two younger ages were defined on a calendar-year basis, while the 17-year-olds were defined on an October 1 to September 30 basis. This resulted in modal grades of 4, 8, and 11. To allow for age cohorts that were exactly four years apart, in the 1986 main assessment all ages were defined on an October 1 to September 30 basis, resulting in modal grades of 3, 7, and 11. Special studies (Kaplan, Beaton, Johnson, & Johnson, 1988) were conducted to measure the effect of the changes in age definition. Because of problems encountered in assessing third graders, in 1988 the ages were redefined on a calendar-year basis, with the modal grades being 4, 8, and 12. These were the age definitions used in the 1990, 1992, 1994, and 1996 main assessments.*

(continued)

Table 1-2 (continued)

National Assessment of Educational Progress

Subject Areas, Grades, and Ages Assessed: 1969-1996

		Grades/Ages Assessed										
Assessment Year[3]	Subject Area(s)	Grade 3	Grade 4	Age 9	Grade 7	Grade 8	Age 13	Grade 11	Grade 12	Age 17	Age 17OS[1]	Adult
1996	Mathematics		X			X			X			
	Science		X			X			X			
	Reading (long-term trend)		X	X		X	X	X		X		
	Writing (long-term trend)		X	X		X	X	X		X		
	Mathematics (long-term trend)			X			X			X		
	Science (long-term trend)			X			X			X		
	State Mathematics		X			X						
	State Science		X			X						

[1] *Age 17 students who had dropped out of school or had graduated prior to assessment.*

[3] *It should be noted that somewhat different age definitions were used in the 1984, 1986, and 1988 assessments. In the 1984 assessment, the two younger ages were defined on a calendar-year basis, while the 17-year-olds were defined on an October 1 to September 30 basis. This resulted in modal grades of 4, 8, and 11. To allow for age cohorts that were exactly four years apart, in the 1986 main assessment all ages were defined on an October 1 to September 30 basis, resulting in modal grades of 3, 7, and 11. Special studies (Kaplan, Beaton, Johnson, & Johnson, 1988) were conducted to measure the effect of the changes in age definition. Because of problems encountered in assessing third graders, in 1988 the ages were redefined on a calendar-year basis, with the modal grades being 4, 8, and 12. These were the age definitions used in the 1990, 1992, 1994, and 1996 main assessments.*

1.3 DEVELOPMENT OF ASSESSMENT OBJECTIVES, ITEMS, AND BACKGROUND QUESTIONS

In 1996, NAEP conducted main assessments of students at all three grade levels in mathematics and science. These assessments entailed the generation of a large number of cognitive items—items measuring knowledge and skills. In addition, a large number of background and attitude questions were asked of students, and school, teacher and instructional questions were asked of principals and teachers. Details on the item development procedures for the 1996 main assessment are given in Chapter 2; this section provides an overview. (In addition to the main assessments and the special assessments, long-term trend studies were conducted in reading, mathematics, science, and writing. Since the instruments used for these studies consisted entirely of items used in previous assessments, no developmental tasks were required for their use in the 1996 assessment.)

In addition to the cognitive items, several questionnaires were developed: a common student Background Questionnaire given to all assessed students of a given grade, a School Characteristics and Policies Questionnaire, Teacher Questionnaires for teachers of fourth- and eighth-grade students in mathematics and science and for teachers of twelfth-grade students who were assessed in advanced mathematics, and an SD/LEP Student Questionnaire. Each of these questionnaires was developed through a broad-based consensus process.

All items in the assessment underwent extensive reviews by subject area and measurement specialists, as well as careful scrutiny to eliminate any potential bias or lack of sensitivity to any group. Further, the items were field tested on a representative group of students. Based on the results of the field test, items were revised or modified as necessary and then again reviewed for bias. With the help of staff and outside reviewers, the Instrument Development Panels selected the items to include in the assessment. After the items were selected and formed into the final groupings or blocks of items, they were carefully reviewed by the National Center for Education Statistics (NCES), the Office of Management and Budget (OMB), and the National Assessment Governing Board (NAGB).

The assessment instruments included multiple-choice items, constructed-response items scored dichotomously, constructed-response items scored polytomously, and cluster items in both mathematics and science. The constructed-response items were professionally scored as described in Chapter 7.

1.4 THE 1996 SAMPLE DESIGN

The sample for the 1996 NAEP assessment was selected using a complex three-stage sample design. The three-stage sample design includes (1) the sampling of students from (2) selected schools within (3) 94 selected geographic areas, called primary sampling units (PSUs), across the United States. The 1996 sample design differed from previous years due to oversampling of SD/LEP students. With the inclusion of the different inclusion rules and the availability of accommodations, the sample design was similar to that used in 1986, 1988, 1990, 1992, and 1994 and is described in detail by Westat, Inc., the firm contracted by NCES to select the sample, in *The 1996 NAEP Sampling and Weighting Report* (Wallace & Rust, 1999). The following sections provide an overview of the five steps used to draw NAEP samples using the three-stage sample design. Further details are given in Chapter 3. Steps 3 and 4 describe the assignment of sample types and assessment sessions to the second sampling unit schools. Steps 5a through 5c contain procedures for the collection of data for SD/LEP students, teachers, and schools.

Step 1: Primary Sampling Units

In the first stage of sampling, the United States (the 50 states and the District of Columbia) was divided into geographic primary sampling units (PSUs). Each PSU met a minimum size requirement and generally comprised either a consolidated metropolitan statistical area (CMSA), a metropolitan statistical area (MSA), a single county, or a group of contiguous counties. The PSUs were classified into four regions (Northeast, Southeast, Central, West), each containing about one-fourth of the U.S. population. In each region, PSUs were additionally classified as MSA or nonMSA. This resulted in eight subuniverses of PSUs.

Ninety-four of the PSUs were selected for the 1996 main assessment. Twenty-two PSUs were designated as certainty units because of their size, and were included in the sample with certainty. The remaining smaller PSUs were not guaranteed to be selected and were accordingly designated as noncertainty PSUs. Within each major stratum (subuniverse), further stratification was achieved by ordering the noncertainty PSUs according to several additional socioeconomic characteristics. Seventy-two PSUs were selected, one per stratum from each of the noncertainty strata, with probability proportional to size (total population from the 1990 census). To enlarge the samples of Black and Hispanic students, thereby enhancing the reliability of estimates for these groups, PSUs from the high-minority subuniverses were sampled at twice the rate of those from the other subuniverses. This was achieved by creating smaller strata within the high-minority subuniverses.

For the long-term trend samples, 52 PSUs were selected: 10 PSUs were selected with certainty; six additional PSUs were selected from the 12 remaining main sample certainty PSUs; and 36 PSUs were selected from the 72 noncertainty strata independently of PSU selections for the main samples.

➪ Step 2: Selection of Schools

In the second stage of sampling for the main assessments, the public schools (including Bureau of Indian Affairs (BIA) schools and Department of Defense Education Activity (DoDEA) schools) and nonpublic schools (including Catholic schools) within each of the selected PSUs were listed according to the grade ranges associated with the three age classes. An independent sample of schools was selected separately for each of the grades so that some schools were selected for assessment of two grades, and a few were selected for all three. Schools within each PSU were selected (without replacement) with probabilities proportional to assigned measures of size with oversampling of nonpublic schools and of schools with high minority enrollment. Overall probabilities of selection for high-minority schools were twice those for other schools while the probabilities of selection of nonpublic schools were triple those of low-minority public schools of the same size. The increased probabilities of selection enlarged the samples of Black and Hispanic students and the samples of students from nonpublic schools, thereby enhancing the reliability of estimates for these groups. Details of the probabilities used for school selection appear in Chapter 3.

The samples of schools for the long-term trend assessments were drawn in a manner very similar to that used for the main assessments. The chief difference in the two samples was that nonpublic schools and schools with high minority enrollment were not oversampled for the long-term trend assessments. Schools were not selected for both main and long-term trend assessments at the same age/grade.

For the main samples, the overall school cooperation rate was 86 percent for grade 4, 83 percent for grade 8, and 79 percent for grade 12. For the long-term trend samples, the overall school cooperation rate was 85 percent for age class 9, 84 percent for age class 13, and 81 percent for age class 17. In certain instances, refusing schools were replaced by substitutes according to the rules indicated in Chapter 3.

➪ Step 3: Assigning Sample Type to Schools

In order to determine the effect of using different criteria for excluding students from the assessment, three different sample types were assigned to the schools selected for the main assessment. In sample type 1 schools, the inclusion criteria for the main samples were identical to those used in 1990 and 1992. In sample type 2 schools, new 1996 inclusion criteria were used. In sample type 3 schools, the new 1996 inclusion criteria were used and accommodations were offered to SD/LEP students. More detailed information on assigning sample type to schools is provided in Chapter 3.

➪ Step 4: Assigning Assessment Sessions to Schools

Sessions were assigned to the selected schools found to be in-scope at the time of session assignment, as described in Chapter 3. Sessions were assigned to schools with three aims in mind. The first was to distribute students to the different session types across the whole sample for each age class so that the target numbers of assessed students would be achieved (in each sample type separately in the main assessments). The second was to maximize the number of different session types that were administered within a given selected school, without creating unduly small sessions. The third was to give each student an equal chance of being selected for a given session type regardless of the number of sessions conducted in the school.

Step 5: Sampling Students

In the third stage of sampling, a consolidated list was prepared for each school of all grade- and age-eligible students (for long-term trend) or all grade-eligible students (for the main assessments) for the age class for which the school was selected. To provide the target sample size, a systematic selection of eligible students was made from this list, if necessary. In small- and medium-sized schools all eligible students were in the sample. For schools assigned to more than a single session type, students were assigned by Westat district supervisors to one of the various session types (audiotape or print administration) using specified procedures. No student was assigned to more than one session.

Step 5a: Excluded Students

Despite NAEP's goal to assess all selected students, certain selected students were judged by school authorities as being incapable of participating meaningfully in the assessment. For each student who was excluded, school staff who had knowledge of the student's capabilities completed an SD/LEP student questionnaire, listing the reason for exclusion and providing some background information. For each SD/LEP student who was included in the assessment, school staff also completed an SD/LEP student questionnaire.

Specific guidelines for exclusion were provided for all samples in the 1996 assessment. However, somewhat different criteria were used for the long-term trend samples than for the main assessment samples. In addition, the inclusion criteria for the main samples differed by sample type.

The exclusion guidelines for the long-term trend samples were the same as those used in previous assessments. Three types of students could be excluded under these guidelines—non-English speaking students, students with mental retardation who are educable but who were judged incapable of meaningfully responding to exercises appropriate to their age level, and students so functionally disabled that they could not perform in the NAEP assessment situation.

As stated previously, for the main samples, the procedures for assessing students with disabilities (SD) and students of limited English proficiency (LEP) varied by sample type. The exclusion procedure used in sample type 1 differed somewhat from that used in sample types 2 and 3. In sample type 1 schools, the inclusion criteria for the main samples were identical to those used in 1990 and 1992. These criteria were intended to be somewhat more rigorously defined than those used in the long-term trend samples. In sample type 2 schools, new 1996 inclusion criteria were used. In sample type 3 schools, the new 1996 inclusion criteria were used and accommodations were offered to SD/LEP students. The new inclusion criteria was developed to more closely match the procedures used by many states and school districts in testing situations. Both sets of the inclusion rules are presented in Chapter 5.

Step 5b: Sampling Teachers

Teachers of fourth- and eighth-grade students assessed in mathematics and science and twelfth-grade students assessed in advanced mathematics were identified and asked to complete a questionnaire (described in Chapter 2) about their background and experiences and about instructional practices, by class, for any classes containing assessed students.

Step 5c: The School Characteristics and Policies Questionnaires

A School Characteristics and Policies Questionnaire was mailed to every sampled school by Westat before the assessment for completion by the principal or school administrator. The Westat supervisor then collected the questionnaires and returned them to ETS. The School Characteristics and Policies Questionnaire is described in Chapter 2.

1.5 ASSESSMENT INSTRUMENTS

Four types of instruments were used in the 1996 assessment: student assessment booklets (which included the student common **Background Questionnaire** as well as cognitive items), SD/LEP Student Questionnaires, Teacher Questionnaires, and a School Characteristics and Policies Questionnaire. This section provides an overview of these instruments; more detailed information can be found in Chapter 4.

The student common Background Questionnaires were completed by the students participating in the 1996 assessment. These questionnaires included questions about the students' race/ethnicity, parental education levels, and other background variables specified by NCES and a committee of survey, content, and education experts. These questionnaires appeared at the beginning of some student assessment booklets and at the end of others. The student assessment booklets also included subject-related **background questions** about instructional opportunity, and interest in and attitudes towards the subject area.

1.5.1 Student Assessment Booklets—Main Assessment

1.5.1.1 Student Assessment Booklets—Main Assessment—Mathematics

Each student assessed in mathematics received a booklet containing a set of general background questions, content questions, subject-specific background questions, and questions about his or her motivation and familiarity with the assessment materials. The content questions were assembled into sections or blocks. Students in the main assessment were given three 15-minute blocks. Those sampled for the theme assessment completed one 15-minute block and one 30-minute block. Those sampled for the advanced study at grade 8 completed three 20-minute blocks; at grade 12 advanced sample students completed three 30-minute blocks. Students in the estimation sample completed one 15-minute block from the main assessment and two paced-tape sections. The overall assessment time for each student was approximately 63 minutes.

The assembly of blocks into booklets for the main assessment and their subsequent assignment to sampled students was determined by a balanced incomplete block (BIB) design with spiraled administration. The student booklets contained two five-minute background sections, a one-minute background section, and three 15-minute blocks of items according to a BIB design.

The BIB design for the 1996 national mathematics assessment was focused by subject area, so that students received booklets containing only blocks of mathematics questions (not science). The BIB design also balances the order of presentation of the 15-minute blocks of items—every 15-minute block appears as the first cognitive block in two booklets, as the second cognitive block in two other booklets, and as the third cognitive block in another two booklets.

The design used in 1996 required that 13 blocks of mathematics items at each grade be assembled into 26 booklets. Theme blocks were placed in two other booklets, and estimation blocks in one other booklet. At grades 8 and 12, the advanced study was placed in one additional booklet. Once assembled, the main assessment booklets were then spiraled and bundled. Spiraling involves interweaving the booklets in a systematic sequence so that each booklet appears an appropriate number of times in the sample. The bundles were designed so that each booklet would appear equally often in each position in a bundle.

The final step in the BIB-spiraling procedure was the assigning of the booklets to the assessed students. The students within an assessment session were assigned booklets in the order in which the booklets were bundled. Thus, most students in an assessment session received different booklets. In the assessment design, representative and randomly equivalent samples of students responded to each item at a given grade level.

Chapter 4 provides more detail on the contents of the mathematics instruments.

1.5.1.2 Student Assessment Booklets—Main Assessment—Science

Each student assessed in science received a booklet containing general background questions, content questions, subject-specific background questions, and questions about his or her motivation and familiarity with the assessment materials. The content questions were assembled into sections or blocks. Students in the main assessment were given three 20-minute blocks at grade 4, and three 30-minute blocks at grades 8 and 12. The last block in every book was a hands-on block. Those sampled for the advanced study at grade 12 completed four 30-minute blocks. The overall assessment time for each student was, on average, 120 minutes.

The assembly of blocks into booklets for the main assessment and their subsequent assignment to sampled students was determined by a complex design with spiraled administration. The student booklets contained two five-minute background sections, a one-minute background section, and three blocks of items.

The design for the 1996 national assessment was focused by subject area, so that students received booklets containing only blocks of science questions (not mathematics). The design also balances the order of presentation of the blocks of items, except for the hands-on blocks, which always appear in position three of a booklet. All other blocks appear an equal number of times in position one and position two. Further, the design was set up to ensure that no student answered more than one theme-based block (though some students did not receive any). This design allows for some balancing of the impact of context and fatigue effects to be measured and reported, but makes allowance for the difficulties and disruption of administering hands-on blocks. It also takes into account the limited breadth of content coverage included in the theme blocks.

The design used in 1996 required that fifteen blocks of mathematics items at each grade be assembled into 37 booklets. At grade 12, the advanced study was composed of three additional booklets. Once assembled, the main assessment booklets were then spiraled and bundled. Spiraling involves interweaving the booklets in a systematic sequence so that each booklet appears an appropriate number of times in the sample. The bundles were designed so that each booklet would appear equally often in each position in a bundle.

The final step in the spiraling procedure was the assigning of the booklets to the assessed students. The students within an assessment session were assigned booklets in the order in which the booklets were bundled. Thus, most students in an assessment session received different booklets. In the assessment design, representative and randomly equivalent samples of about 2,000 students responded to each item at a given grade level.

Chapter 4 provides more detail on the contents of the science instruments.

1.5.2 Student Assessment Booklets—Long-Term Trend Samples

There were two distinct long-term trend samples in the 1996 assessment, each of which required reprinting booklets used in previous assessments:

Reading-Writing Long-Term Trend: Six booklets were used at each of the three age/grades for the purposes of measuring long-term trends in reading and writing. These booklets were identical to booklets used in the 1984 main assessments of reading and writing and in the 1988, 1990, 1992, and 1994 long-term trend assessments of those subjects. Each booklet consisted of a common background block in the beginning of each booklet and three cognitive blocks, either two reading and one writing or one reading and two writing. All cognitive blocks also contained subject-related background questions. The booklets were administered without audiotape and were spiraled together for administration.

***Mathematics-Science Long-Term Trend*:** These instruments were used for the measurement of mathematics and science and were identical to booklets administered in 1990, 1992 and 1994. These booklets contained 15-minute blocks of mathematics and science items; each mathematics block and each science block was administered using audiotape pacing. (At the younger two ages, the booklets also contain a block of reading items, which was print-administered.) There were three booklets each at age 9 and age 13 and two booklets at age 17. The common background questions appeared at the beginning of each booklet. Combined, the booklets at an age contain three blocks of mathematics items and three blocks of science items. Because of the audiotape pacing, each booklet was administered in a separate session.

1.5.3 Other Instruments

Besides the student assessment booklets, other instruments provided data relating to the assessment:

The ***SD/LEP Student Questionnaires*** were completed by the teachers of those students who were selected to participate in the assessment sample who had disabilities (SD) or were classified as Limited English Proficient (LEP). The questionnaires were completed for all SD or LEP students, whether or not they actually participated in the assessment. The questionnaires asked about the nature of the student's disability and the special programs in which the student participated. The response rates for this questionnaire ranged from 92 to 95 percent for the different student samples. The criteria used for excluding students are described in Chapter 5.

Teacher Questionnaires were administered to the teachers of fourth- and eighth-grade students assessed in mathematics and science and teachers of twelfth-grade students who were assessed in advanced mathematics. The Teacher Questionnaire included a general section that contained questions about the teacher's background and experience. The rest of the questionnaire contained questions about instructional practices, by class, for any classes containing assessed students. The response rates ranged from 95 to 100 percent for the different student samples.

School Characteristics and Policies Questionnaires were completed by school principals or their representatives, who provided information about school administration, staffing patterns, special programs, subject requirements, and school resources. The response rates for the different student samples ranged from 92 to 95 percent.

1.6 FIELD OPERATIONS AND DATA COLLECTION

Field operations and data collection for the 1996 assessment were the responsibility of Westat, Inc., and are documented in Chapter 5. The field operation was conducted by a staff at Westat's home office and a larger staff in the field. The Westat home-office staff coordinated all activities related to field operations and managed materials distribution and home-office receipt of assessment reporting forms. The field staff consisted of area supervisors, assessment supervisors, and exercise administrators. The assessment supervisors, who were trained by Westat, were each responsible for the assessment activities in one or more PSUs. Although ETS made initial contact with participating school districts, each assessment supervisor was primarily responsible for making follow-up contacts with these districts, recruiting and training exercise administrators to work with them in administering the assessment sessions, arranging the assessment sessions, and selecting the sample of students to be assessed within each school. The assessment supervisors and the exercise administrators administered the assessments, filled out the necessary forms, performed process control, and shipped the assessment booklets and forms to National Computer Systems (NCS), the subcontractor responsible for processing NAEP materials and data.

Gaining school cooperation was the joint responsibility of Westat and ETS. ETS made the preliminary contacts preparatory to obtaining school cooperation by first contacting the Chief State School Officers, informing them that schools within their states had been selected for the assessment and, in a later letter, listing the selected schools and districts. Later mailings were sent to superintendents of public schools and parochial schools and principals of other nonpublic schools for all schools selected in the assessment. These materials provided an explanation of NAEP, a list of the selected schools in the official's jurisdiction, and a cover letter explaining that a Westat district supervisor would contact them to set up an introductory meeting. Westat district supervisors then scheduled and conducted introductory meetings (both by telephone and in person), worked with the schools to schedule the assessments, and, with the exercise administrators, conducted the assessments. The overall participation rate of schools originally selected in the 1996 assessments was 83 percent for the main samples and 84 percent for the long-term trend samples. Further detail on school participation rates is given in Chapter 3.

The main assessment sessions were conducted between January 3 and March 29, 1996, at all three grade levels. The age 9/grade 4 long-term trend assessments were carried out between January 3 and March 8, 1996; the age 17/grade 11 long-term trend samples were conducted between March 11 and May 10, 1996. The age 13/grade 8 long-term trend assessments were carried out between October 9 and December 22, 1995. When the main assessments of the long-term trend subjects were first collected in 1987 and 1986, studies were completed to take into account the difference in assessment time across the samples (Kaplan, Beaton, Johnson, & Johnson, 1988).

Two special studies that required additional steps in the sampling process were included in the 1996 main assessment. One of these special studies involved students who were eligible for advanced mathematics or science sessions. Advanced sessions were only available to designated students at grade 8 in mathematics and at grade 12 in mathematics and science. Further details on the advanced sessions is provided in Chapters 3 and 5.

The other special study involved applying two versions of the SD/LEP "inclusion" criteria for NAEP assessments and, in some schools, offering accommodations for testing students designated as SD/LEP. In the study, the school sample was divided into three subsamples: S1 (sample type 1), S2 (sample type 2), and S3 (sample type 3). The purpose of these subsamples was to collect data under the same conditions as previous assessments in order to maintain trend in mathematics within NAEP; evaluate the impact of a revised, more specific set of inclusion criteria; and evaluate the combined effect of the new criteria and the use of accommodations for testing students. Further details on this special study are provided in Chapters 3 and 5. Results for the study appear in the SD/LEP report along with a technical procedural appendix describing the special analyses completed for the study.

An automated management system tracked and recorded the progress of field work throughout the 1996 assessment period. In addition, progress was constantly monitored through telephone reports held between the area supervisors and the assessment supervisors and between the area supervisors and the home office staff.

Both Westat and ETS participated in the quality control of the field administration, which involved on-site visits by Westat and ETS staff to verify the sampling of the students and to observe the conduct of the assessment by the supervisors and the exercise administrators.

1.7 MATERIALS AND DATA PROCESSING

After completing an assessment session, Westat field supervisors and exercise administrators shipped the assessment booklets and forms from the field to National Computer Systems for entry into computer files, professional scoring, and creating the data files for transmittal to ETS. Careful checking assured that all data from the field were received. More than 134,000 booklets and questionnaires were received and processed for the national portion of the 1996 assessment. The extensive processing of these data is detailed in Chapter 6.

The student data were transcribed into machine-readable form by scanning the student instruments with an optical scanning machine. An intelligent data entry system was used for resolution of the scanned data, the entry of documents rejected by the scanning machine, and the entry of information from the questionnaires. Additionally, each piece of input data was checked to verify that it was of an acceptable type, that it was within a specified range or ranges of values, and that it was consistent with other data values. The entry and editing of materials is discussed in Chapter 6.

1.8 PROFESSIONAL SCORING

Items requiring a written response from the student (constructed-response items) were included in the main and state assessments in mathematics and science and in the long-term trend assessments in reading, mathematics, and writing. More than nine million constructed responses were read and marked by the professional scoring staff for the national and state portions of the 1996 assessment.

Image processing and scoring were again used in 1996. Images of students' responses to the constructed-response items were scanned into computerized form, then scored online by professional raters.

Chapter 7 describes the professional scoring operation, including an overview of the scoring guides, the training procedures, and the scoring process for each subject area.

1.9 CREATION OF THE DATABASE

Before analyses could begin, the student response data, school, teacher, and SD/LEP student questionnaire data, and all sampling weights had to be integrated into a coherent and comprehensive database. This database, which was used for all analyses, was also the source for the creation of two NAEP database products—the item information database and the secondary-use data files. Secondary-use data files include sample control statement files for SAS and SPSS statistical systems and the NAEP Data on Disk product suite. The Data on Disk products, including a complete set of secondary-use data files on CD-ROM, PC-based NAEP data extraction software, and NAEP analysis modules, make secondary use of NAEP data much easier than it has been in the past. The quality of the data resulting from the complete data entry system, from the actual instruments collected in the field to the final machine-readable database used in analysis, was verified by selecting field instruments at random and performing a character-by-character comparison of these instruments with their representations in the final database. Chapter 8 provides details on the database, quality control activities, and database products.

Chapter 2

DEVELOPING THE NAEP OBJECTIVES, ITEMS, AND BACKGROUND QUESTIONS FOR THE 1996 ASSESSMENTS OF MATHEMATICS AND SCIENCE[1]

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2.1 INTRODUCTION

In 1996, the main NAEP assessments were conducted in mathematics and science.[2] Long-term trend assessments were also conducted in reading, writing, mathematics, and science; these assessments are composed of instruments identical to those used in previous years. Additional data were gathered under the auspices of the State Assessment program, which in 1996 assessed mathematics at grades 4 and 8 using representative samples of public- and nonpublic-school students in 44 states[3], the District of Columbia, Department of Defense Domestic Dependent Elementary and Secondary Schools (DDESS), Department of Defense Dependents Schools (DoDDS), and Guam. The 1996 State Assessment program also assessed science at grade 8 using representative samples of public- and nonpublic-school students in 43 states, the District of Columbia, DDESS, DoDDS, and Guam; DDESS and DoDDS students were also assessed in science at grade 4. A summary of the main assessment subject areas follows:

> **Mathematics**: A mathematics assessment was administered to national samples at grades 4, 8, and 12. This assessment was designed around the measurement of five mathematics content areas, and continued a trend line begun in 1990. In other words, many of the assessment questions were used in the 1990 and 1992 NAEP assessments; others were newly developed for 1996. A mixture of multiple-choice, short constructed-response, and extended constructed-response questions made up the assessment; in aggregate, well over half of the student assessment time was spent answering constructed-response questions. On some portion of the assessment, students were required to use calculators and other hands-on materials. In addition to the instruments used to generate the main reporting scales, three supplemental mathematics surveys were conducted at the national level. At each grade, special instruments were administered to representative national samples that were designed to measure the estimation skills of students. Second, separate samples at all grades were given "thematic" instruments constructed to measure the ability of students to solve in-depth mathematics problems. Finally, at grades eight and twelve a special study was conducted. In this study, students with advanced mathematics training were administered special assessment booklets whose contents were more advanced than those of the main assessment.
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> **Science**: A science assessment was administered to national samples at grades 4, 8, and 12. The assessment measured a broad range of science-education outcomes. Because the 1996 science assessment was based on a new framework, it represents the beginning of a

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[1] Stephen Lazer manages assessment development activities for the NAEP program at ETS.

[2] Copies of the frameworks for these assessments are available from the National Assessment Governing Board (NAGB) *http://www.nagb.org*.

[3] Not all participating jurisdictions gathered both public- and nonpublic-school samples.

new trend line. The assessment involved three different types of testing. Some portions covered general scientific knowledge and skills. Others sections of the survey tested students abilities to answer questions in an in-depth thematic or topical area. Finally, each sampled student completed a component that involved conducting a hands-on science experiment. A combination of multiple-choice, short constructed-response, and extended constructed-response questions made up the assessment; in aggregate, well over half of the student assessment time was spent answering constructed-response questions. In addition to the main assessment, a special study of students with advanced scientific training was conducted at grade 12.

From its inception, NAEP has developed assessments through a consensus process and the 1996 instruments were no exception. Under the direction of the National Assessment Governing Board (NAGB), educators, scholars, and citizens representative of many diverse constituencies and points of view designed assessment frameworks for both subject areas. Staff at Educational Testing Service (ETS) who were subject-area experts in their respective fields worked with subject-area consultants well versed in assessment methodology to develop assessment questions appropriate to the objectives. All questions underwent extensive reviews by subject-matter specialists, measurement specialists, and ETS employees. Questions were assembled and printed into booklets suitable for matrix sampling and then administered either by a trained field staff (for the national program) or by state or local school district staff (for the State Assessment program) to stratified, multistage probability samples of students.

All 1996 assessment development efforts were governed by four major considerations:

1. The primary goal of the development process was to craft instruments that matched the content definitions included in the assessment frameworks, which was developed through consensus processes conducted under the auspices of the National Assessment Governing Board (NAGB).

2. As outlined in the ETS proposal for the administration of the NAEP cooperative agreement (ETS, 1992), the development of the items was guided by an Instrument Development Committee and further reviewed by state representatives and classroom teachers from across the country. In addition, the items had to be carefully reviewed for potential bias.

3. As described in the *ETS Standards of Quality and Fairness* (ETS, 1987), all materials developed at ETS were in compliance with specified procedures. In particular, all questions were carefully reviewed for content accuracy, testworthiness, and potential bias.

4. As per federal regulations, all NAEP cognitive and background items were submitted to a federal clearance process. This process involved review of all cognitive items by NCES and NAGB, and review of all background questions by the Office of Management and Budget (OMB), the Information Management Team (IMT) of the Department of Education, and NCES.

The development effort for the 1996 assessment included questionnaires[4] for students, teachers, and school administrators, in addition to a substantial number of cognitive items for both subject areas.

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[4] These questionnaires can be obtained from the National Center for Education Statistics (NCES).

The following sections include general overviews about setting objectives and developing items and specific details about developing subject-specific objectives and assessments. A list of the consultants who participated in the 1996 development process is included in Appendix A.

2.2 GENERAL OVERVIEW OF THE 1996 ASSESSMENT FRAMEWORKS

The subject-area objectives for each NAEP assessment are determined through a legislatively mandated consensus process. These objectives typically take the form of frameworks, or matrices, delineating the important content and process areas to be assessed. In addition to these broad frameworks, the Council of Chief State School Officers (CCSSO), and therefore NAGB, provided detailed descriptions of item types and the numbers of items to be selected for each category. The various frameworks for the 1996 assessments are described below.

The frameworks for the main 1996 NAEP assessments were developed through consensus processes conducted by the CCSSO working under contract to NAGB. The projects involved participation and review by many groups, including teachers, content-area scholars, educational policymakers, and members of the general public. In addition to people directly involved in the framework development processes, the documents were reviewed by state education and testing officials, by representatives of professional associations, and by researchers. In addition, the frameworks were the subject of testimony at public hearings arranged to allow the widest possible participation in the consensus process. The objectives resulting from these processes reflect neither a narrowly defined theoretical framework nor the view of every participant. They do, however, represent the thinking of a broad cross-section of individuals who are expert in the various content areas and who are deeply committed to the improvement of American education.

The framework that governs the 1996 NAEP **mathematics** assessment is an enhanced version of the framework that governed the development of the 1990 and 1992 assessments. This framework was originally developed under the auspices of the Council of Chief State School Officers (CCSSO); it was revised in 1991-1992 through a consensus project managed by the College Board. It was this enhanced framework that governed the instrument development activities related to the 1996 assessment. The revisions to the framework were minor, and allow for continued measurement of educational progress through comparisons with 1990 and 1992 results. The mathematics framework is organized according to a five-by-three matrix of content strands by mathematical abilities. The content strands, which make up the main reporting subscales, are:

- Number Sense, Properties, and Operations;
- Measurement;
- Geometry and Spatial Sense;
- Data Analysis, Statistics, and Probability; and
- Algebra and Functions.

In addition, the assessment was designed to measure the three mathematical abilities of:

- Conceptual Understanding,
- Procedural Knowledge, and
- Problem Solving.

All exercises in the assessment were classified as measuring one of the content strands and one of the abilities. Additional specifications in the framework are related to an assessment dimension referred to as *mathematical power*. Mathematical power is conceived as consisting of mathematical abilities within a broader context of *reasoning* and with *connections* across the broad scope of mathematical content and thinking. *Communication* is viewed as both a unifying thread and a way for students to provide meaningful responses to tasks.

The framework for the 1996 **science** assessment is structured according to a matrix organized according to two major dimensions: *fields of science* and *knowing and doing science*. The fields of science, which make up the subscales on which assessment results are analyzed and reported, are the *earth*, *physical*, and *life* sciences. The cognitive dimension, knowing and doing science, is organized into three categories, *conceptual understanding*, *scientific investigation*, and *practical reasoning*. In addition, the framework includes requirements for measurement of content that crosses other categorical boundaries. Specifically, the *nature of science* and *themes* are categories that should integrate the three fields of science, rather than represent separate content.

2.3 GENERAL OVERVIEW OF PROCEDURES FOR DEVELOPING THE ITEMS

A carefully developed and tested series of steps, similar to those used for past NAEP assessments, was utilized to create assessment items that reflected mathematics and science objectives and that measured achievement related to them (see Sections 2.4 through 2.6 for more detail). The steps were as follows:

1. NAGB provided item specifications and frameworks in each subject area.
2. The Instrument Development Committees in both subject areas provided guidance to NAEP staff about how the objectives could be measured given the realistic constraints of resources and the feasibility of measurement technology. The committees made recommendations about priorities for the assessment (within the context of the assessment framework) and the types of items to be developed.
3. Items were chosen for the assessment through an extensive selection process that involved the input of practitioners from across the country as well as from members of the Instrument Development Committees.
4. Specialists with subject-matter expertise, skills, and experience in creating items according to specifications were identified from inside and outside ETS to develop and review the assessment questions.
5. The items were reviewed and revised by NAEP/ETS staff and external test specialists.
6. Representatives from the State Education Agencies met and reviewed all items and background questionnaires that were scheduled to be part of the state assessment.
7. Language editing and sensitivity reviews were conducted as required by *the ETS Standards for Quality and Fairness*.
8. Field test materials were prepared, including those necessary to secure clearance by the Office of Management and Budget.

9. A field test was conducted in many states, the District of Columbia, and three territories.[5]

10. Representatives from State Education Agencies met and reviewed the field test results for all exercises selected for the state assessment.

11. Based on the field test analyses, new items for the 1996 assessment were revised, modified, and re-edited, where necessary. The items once again underwent the full range of ETS reviews.

12. The Instrument Development Committees approved the selection of items to include in the 1996 assessment.

13. After a final review and check to ensure that each assessment booklet and each block met the overall guidelines for the assessment, the booklets were typeset and printed.

The following sections describe the development of the mathematics and science assessments in more detail.

2.4 DEVELOPING THE MATHEMATICS ASSESSMENT

2.4.1 Overview

The framework that governs the 1996 NAEP **mathematics** assessment is an enhanced version of the framework used on the 1990 and 1992 assessment. Similar to other NAEP assessments, the 1990 mathematics framework was developed through a broad-based consensus process managed by the CCSSO. In 1991-1992, the National Assessment Governing Board (NAGB) contracted with The College Board to review and revise the framework in preparation for the assessment originally planned for 1994 and administered, in fact, in 1996. The development process involved a committee of mathematicians and mathematics education specialists. Educators, scholars, and citizens, representative of many diverse constituencies and points of view, participated in the national consensus process to review and revise objectives for the assessment.

The instrument used in the 1996 mathematics assessment was composed of a combination of new items developed for administration in 1996[6] and items from the 1992 and 1990 assessments. Those items that were carried over from the 1992 and 1990 instruments comprised approximately 60 percent of the 1996 instrument. The remaining portion was made up of new items developed according to the recommendations included in the enhanced assessment specifications. Maintaining approximately 60 percent of the instrument across the two assessment years (1992 and 1996) allowed for the reporting of trends in mathematics performance. At the same time, developing a new set of items made it possible to release approximately 40 percent of the 1992 assessment for public use.

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[5] In this case, two field tests were conducted. The mathematics and science assessments were originally scheduled for 1994; thus a 1993 field test was conducted. This field test was designed to provide replacement items for those released in mathematics and all exercises needed in the new science assessment. Because the assessments were delayed until 1996, a supplementary field test was conducted in 1995. In mathematics, this field test was used for the development of theme and advanced blocks, and in the development of assessment accommodations. In science, the 1995 field test was used to develop more general science exercises for the main assessment.

[6] As was noted above, many of the new items were originally scheduled for use in 1994; however, the mathematics assessment was deferred until 1996. Other items were developed and field tested in 1995. For purposes of this report, we will refer to all exercises that were used in 1996 but that were not part of earlier NAEP surveys as having been "newly developed for 1996."

In developing the new portion of the 1996 NAEP mathematics assessment, the same procedures used in 1992 were followed; however, new items were constructed to meet the demands of the revised framework. All items underwent extensive reviews by specialists in mathematics, measurement, and bias/sensitivity; items developed for grades four and eight were also reviewed by state representatives. The core goals of the ETS assessment development process and procedures used to realize these goals are outlined in the introduction to this chapter and in Section 2.3.

The following sections include a detailed description of the development of the framework, objectives, and items for the 1996 NAEP mathematics assessment. Section 2.4.8 describes the student background questionnaires and the reading teacher questionnaire. Additional information on the structure and content of assessment booklets can be found in Chapter 4. Various committees worked on the development of the framework, objectives, and items for the mathematics assessment. The list of committee members and consultants who participated in the 1996 development process is provided in Appendix A.

2.4.2 Development of the Assessment Framework

NAGB is responsible for developing assessment objectives and test specifications for NAEP surveys. Appointed by the Secretary of Education from lists of nominees proposed by the board itself in various statutory categories, the 26-member board is composed of state, local, and federal officials, as well as educators and members of the public.

Under contract with NAGB, The College Board convened a committee during 1991 and 1992 to develop an enhanced version of the framework that had been used during the development of the 1990 and 1992 assessments (the 1992 mathematics assessment had already been developed at the time the development of this enhanced framework was begun). The enhanced version was needed to better reflect the rapid evolution of mathematics instruction that was underway in the early 1990s as a result of the emergence of the National Council of Teachers of Mathematics (NCTM) *Curriculum and Evaluation Standards for School Mathematics*. The *Standards* were rapidly becoming one of the acknowledged barometers for measuring achievement. The development process for the enhanced framework was based on consensus building, and included the committee listed in Appendix A.

During this development process, input and reactions were continually sought from a wide range of members of the mathematics field, experts in assessment, school administrators, and state staff. In particular, the process was informed by recommendations of leading professional organizations in mathematics.

2.4.3 Framework and Assessment Design Principles

The planning committee involved in the review and revision of the NAEP mathematics framework was given a number of working guidelines and goals by the National Assessment Governing Board and by the steering committee that oversaw the process. These guidelines directed the planning committee to develop assessment specifications that called for performance-oriented exercises that focus on problem-solving and provide students with opportunities to communicate their understandings in mathematics. The framework should, according to these guidelines, embody a broad view of mathematics that addressed the high levels of mathematical literacy needed for employability, personal development, and citizenship. Also, the framework should take into account findings of contemporary research on mathematics and mathematics education, and would expand the range of assessment tools to include formats that more closely resembled classroom activities.

The development was further guided by the consideration that the assessment should reflect many of the states' curricular emphases and objectives in addition to what various scholars, practitioners, and interested citizens believed should be included in the curriculum. Accordingly, the committee focused on several general principles in revising the NAEP mathematics assessment. These principles are:

- The purpose of the NAEP mathematics assessment is to provide information about the progress and achievement of students in general rather than to test individual students' ability. NAEP is designed to inform policymakers and the public about mathematics ability in the United States. Furthermore, NAEP state data can be used to inform states of their students' relative strengths and weaknesses.

- The term "mathematical literacy" encompasses such broad skills and abilities as being able to reason numerically, algebraically, geometrically, spatially, and with data; identify and apply problem-solving strategies appropriately in situations; and use the language of mathematics to construct clear and coherent responses to problems or tasks.

- The mathematics assessment should use authentic problems and tasks that address important mathematics concepts and skills so that the assessment tool will demonstrate a close link to desired classroom instruction and students' mathematics experiences.

- Every effort should be made to make the best use of available methodology and resources in driving assessment capabilities forward.

- Every effort must be made in developing the assessment to represent a variety of opinions, perspectives, and emphases among professionals in universities, as well as in state and local school districts.

2.4.4 Framework for the 1996 Assessment

The framework for the 1996 mathematics assessment is organized according to a five-by-three matrix of content strands by mathematical abilities. The content strands are:

- Number Sense, Properties, and Operations;
- Measurement;
- Geometry and Spatial Sense;
- Data Analysis, Statistics, and Probability; and
- Algebra and Functions.

These content strands were assessed across the three mathematical abilities of:

- Conceptual Understanding,
- Procedural Knowledge, and
- Problem Solving.

Figures 2-1 and 2-2 describe the five content strands and three mathematical abilities that guided the development of the 1996 mathematics assessment.

Figure 2-1

Descriptions of Content Strands in Mathematics

Number Sense, Properties, and Operations

This strand focuses on students' understanding of numbers (whole numbers, fractions, decimals, integers, real numbers, and complex numbers), operations, and estimation, and their application to real-world situations. Students will be expected to demonstrate an understanding of numerical relationships as expressed in ratios, proportions, and percents. Students also will be expected to understand properties of numbers and operations, generalize from number patterns, and verify results.

Measurement

The measurement strand focuses on understanding of the process of measurement and on the use of numbers and measures to describe and compare mathematical and real-world objects. Students will be asked to identify attributes, select appropriate units and tools, apply measurement concepts, and communicate measurement-related ideas.

Geometry and Spatial Sense

As described in the NCTM *Standards*, spatial sense must be an integral component of the study and assessment of geometry. Understanding spatial relationships allows students to use the dynamic nature of geometry to connect mathematics to their world.

This content strand is designed to extend well beyond low-level identification of geometric shapes into transformations and combinations of ,those shapes. Informal constructions and demonstrations (including drawing representations), along with their justifications, take precedence over more traditional types of compass-and-straightedge constructions and proofs. While reasoning is addressed throughout all of the content strands, this strand continues to lend itself to the demonstration of reasoning within both formal and informal settings. The extension of proportional thinking to similar figures and indirect measurement is an important connection here.

(continued)

Figure 2-1 (continued)

Descriptions of Content Strands in Mathematics

Data Analysis, Statistics, and Probability

The important skills of collecting, organizing, reading, representing, and interpreting data will be assessed in a variety of contexts to reflect the pervasive use of these skills in dealing with information. Statistics and statistical concepts extend these basic skills to include analyzing and communicating increasingly sophisticated interpretations of data. Dealing with uncertainty and making predictions about outcomes require an understanding not only of the meaning of basic probability concepts but also the application of those concepts in problem-solving and decision-making situations.

Questions will emphasize appropriate methods for gathering data, the visual exploration of data, a variety of ways of representing data, and the development and evaluation of arguments based on data analysis. Students will be expected to apply these ideas in increasingly sophisticated situations that require increasingly comprehensive analysis and decision making.

Algebra and Functions

This strand extends from work with simple patterns at grade 4, to basic algebra concepts at grade 8, to sophisticated analysis at grade 12, and involves not only algebra but also precalculus and some topics from discrete mathematics. As described in the NCTM *Standards*, these algebraic concepts are developed throughout the grades with informal modeling done at the elementary level and with increased emphasis on functions at the secondary level. The nature of the algebraic concepts and procedures included in the assessment at all levels reflects the NCTM *Standards*. Students will be expected to use algebraic notation and thinking in meaningful contexts to solve mathematical and real-world problems, specifically addressing an increasing understanding of the use of functions (including algebraic and geometric) as a representational tool.

Figure 2-2

Descriptions of Mathematical Abilities

Conceptual Understanding

Students demonstrate conceptual understanding in mathematics when they provide evidence that they can recognize, label, and generate examples and nonexamples of concepts; use and interrelate models, diagrams, manipulatives, and varied representations of concepts; identify and apply principles (i.e., valid statements generalizing relationships among concepts in conditional form); know and apply facts and definitions; compare, contrast, and integrate related concepts and principles to extend the nature of concepts and principles; recognize, interpret, and apply the signs, symbols, and terms used to represent concepts; or interpret the assumptions and relations involving concepts in mathematical settings.

Conceptual understanding reflects a student's ability to reason in settings involving the careful application of concept definitions, relations, or representations of either. Such an ability is reflected by student performance that indicates the production of examples, common or unique representations, or communications indicating the ability to manipulate central ideas about the understanding of a concept in a variety of ways.

Procedural Knowledge

Students demonstrate procedural knowledge in mathematics when they select and apply appropriate procedures correctly; verify or justify the correctness of a procedure using concrete models or symbolic methods; or extend or modify procedures to deal with factors inherent in problem settings.

Procedural knowledge includes the various numerical algorithms in mathematics that have been created as tools to meet specific needs efficiently. Procedural knowledge also encompasses the abilities to read and produce graphs and tables, execute geometric constructions, and perform noncomputational skills such as rounding and ordering. These latter activities can be differentiated from conceptual understanding by the task context or presumed student background—that is, an assumption that the student has the conceptual understanding of a representation and can apply it as a tool to create a product or to achieve a numerical result. In these settings, the assessment question is how well the student executed a procedure or how well the student selected the appropriate procedure to effect a given task.

Procedural knowledge is often reflected in a student's ability to connect an algorithmic process with a given problem situation, to employ that algorithm correctly, and to communicate the results of the algorithm in the context of the problem setting. Procedural understanding also encompasses a student's ability to reason through a situation, describing why a particular procedure will give the correct answer for a problem in the context described.

Problem Solving

In problem solving, students are required to use their accumulated knowledge of mathematics in new situations. Problem solving requires students to recognize and formulate problems; determine the sufficiency and consistency of data; use strategies, data, models, and relevant mathematics; generate, extend, and modify procedures; use reasoning (i.e., spatial, inductive, deductive, statistical, or proportional) in new settings; and judge the reasonableness and correctness of solutions. Problem solving situations require students to connect all of their mathematical knowledge of concepts, procedures, reasoning, and communication/ representational skills in confronting new situations. As such, these situations are, perhaps, the most accurate measures of students' proficiency in mathematics.

Tables 2-1 and 2-2 show the percentages of assessment time that the framework indicates should be devoted to each content strand and mathematical ability.

Table 2-1

Percentage Distribution of Items by Grade and Content Strand as Specified in the NAEP Mathematics Framework

Content Strand	Grade 4	Grade 8	Grade 12
Number Sense, Properties, and Operations[1]	40%-70%	25%-60%	20%-50%
Measurement	20%	15%	15%
Geometry and Spatial Sense	15%	20%	20%
Data Analysis, Statistics, and Probability	10%	15%	20%
Algebra and Functions	15%	25%	25%

[1] For this category, these percentages are the minimum and maximum that are acceptable, respectively.

Table 2-2

Percentage Distribution of Items by Grade and Mathematical Ability as Specified in the NAEP Mathematics Framework

Mathematical Ability	Grade 4	Grade 8	Grade 12
Conceptual Understanding	33%	33%	33%
Procedural Knowledge	33%	33%	33%
Problem Solving	33%	33%	33%

Note: Some items carry multiple classifications.

2.4.5 Developing the Cognitive Items

The 1996 assessment was designed to serve a dual purpose: to meet the content specifications elaborated in the revised NAEP mathematics framework and to allow for the measurement of changes in student mathematics achievement (that is, to permit linking to the 1990 and 1992 NAEP mathematics assessment). Because of these objectives, the following strategies were adopted in developing the 1996 mathematics assessment. First, at each grade, 8 of the 13 blocks used in the 1992 assessment were carried forward and used in 1996. Items were developed and field tested in 1993 to replace the five blocks from the 1992 assessment that had been released for public use. In addition, other portions of the 1993 field test were used to develop special components of the assessment. To this end, a new block of "estimation" exercises was developed, as were exercises for a special study of students at grades eight and twelve who had received advanced mathematics training. Given the fact that the mathematics assessment was delayed from 1994 until 1996, a supplemental field test was held in 1995 (exercises were developed for this field test in 1994). This round of exercise development was used to build extra exercises for the estimation and advanced components of the assessment. It was also used to build "theme blocks," which were intended to measure in-depth mathematics problem-solving ability.

The development of cognitive items involved careful field testing, both locally and nationally, of grade-appropriate questions and tasks for the assessment. Items were selected from a pool of questions that were written by teachers from across the country as well as by mathematics assessment specialists on staff at ETS. The framework stated that the assessment should include some performance-based questions and tasks that require students to reason and make connections within and across different content strands of mathematics. Final selections of questions used in the 1996 assessment were approved by the Mathematics Instrument Development Committee.

The assessment included constructed-response (short and extended) and multiple-choice items. The decision to use a specific item type was based on a consideration of the most appropriate format for assessing the particular objective. Both types of constructed-response items were designed to provide an in-depth view of students' ability to communicate their understanding of important concepts in mathematics. Short constructed-response questions (scored with either a 2- or 3-level scoring rubric) were used when students needed to respond briefly in order to demonstrate full comprehension. Extended constructed-response questions (scored with a 4- or 5-level scoring rubric) were used when the task required more thoughtful consideration of the problem and engagement in more complex reasoning processes. Multiple-choice items were used when a straightforward, single correct answer was required.

A carefully developed and proven series of steps was used to create the assessment items. These steps are described earlier in the chapter under Section 2.3.

As was mentioned above, the assessment was designed to allow for measurement of trends. Therefore, eight 15-minute blocks at each grade were included in the 1996 assessment that had been a part of the 1992 assessment (and in some cases the 1990 assessment). These blocks were used in precisely the same form as they were in 1992. In addition, one of the paced-tape estimation blocks was carried forward from 1992. The remainder of the exercises used in 1996 were newly developed during either the 1992-1993 or 1994-1995 development cycles.

2.4.6 Development of the Operational Forms

The field tests of new items for the 1996 assessment were conducted in February and March, 1993 and February and March, 1995. The field test involved a convenience sample in which roughly 500 responses were obtained to each item.

The field test data were collected, scored, and analyzed in preparation for meetings with the Mathematics Instrument Development Panel. The objectives that guided the review of these items were:

- to determine which items were most suitable for assessing understanding in mathematics in accordance with the framework;
- to select items that displayed appropriate statistical attributes;
- to determine the need for revisions of items that lacked clarity, or had ineffective item formats;
- to prioritize items to be included in the assessment; and,
- to determine appropriate timing for assessment items.

Committee members, ETS assessment staff, and NAEP/ETS staff reviewed the materials. Item analyses (which provided the mean percentage of correct responses, the r-biserial correlations, and the difficulty level for each item) were used as a guide in identifying and flagging for further review those test questions that were not measuring the intended objective well. In addition, another meeting of representatives from state education agencies was convened to review the field test results for exercises included in the grade four or eight assessments.

Once the committees had selected the items, all items were rechecked for content, measurement, and sensitivity concerns. The federal clearance process was initiated in June 1993 with the submission of draft materials to NCES. The package containing the set of cognitive items assembled into blocks and questionnaires was submitted in August 1993. A revised package with the new thematic blocks and the adjusted advanced and estimation blocks was submitted in July, 1995. Throughout the clearance process, revisions were made in accordance with changes required by the government. After approval, the blocks (assembled into booklets) and questionnaires were readied for printing in preparation for the assessment.

2.4.7 Distribution of Assessment Items

The mathematics assessment developed for use in 1996 was organized according to a series of blocks, each containing a set of questions. Some of the blocks were unique to a particular grade level. Other blocks were designed to be given to students in two grades (either 4 and 8 or 8 and 12) and a few blocks (a small percentage of the blocks used to measure trend) overlap all three grades.

At each grade, the main component of the assessment used for the creation of reporting scales included thirteen different 15-minute blocks of multiple-choice and constructed-response questions (some with both regular and extended constructed-response questions). Two additional books containing 30-minute theme blocks of multiple-choice and constructed-response questions were also used. Two estimation blocks at each grade were part of a special study and were presented to students by a paced-audiotape to assess students' estimation skills. Two 20-minute grade 8 special study blocks and two 30-minute grade 12 special study blocks targeted students in advanced mathematics courses. Of the 13 blocks at each grade that were used for the main assessment:

- three to five blocks at each grade level included items designed to be answered using a calculator. For the grade 4 calculator blocks, students were provided with a 4-function calculator, while at grades 8 and 12 the students were provided with a scientific calculator (students were also provided calculators for the theme blocks and allowed to use their own calculators on the advanced blocks)

- one block at all grade levels contained questions requiring the use of a protractor/ruler (ruler only for grade 4)

- two blocks at each grade involved the use of manipulatives; several of the theme blocks involved the use of manipulatives as well

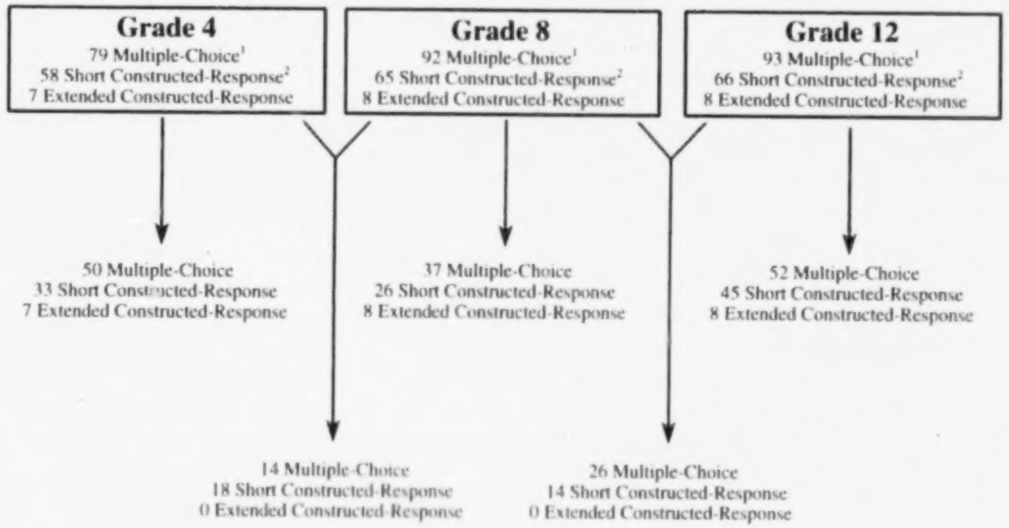
- seven blocks at grade 4 and eight blocks at each of grades 8 and 12 included extended constructed-response items. The extended constructed-response mathematics items call for the student to work through a complex problem, require about five minutes to complete, and were scored on a 0-5 point scale. The theme and advanced blocks also included extended constructed-response items.

The sections that follow discuss the distribution of exercises on the mathematics assessment. For purposes of this discussion, we will limit the calculations to exercises that appeared as part of the main assessment, or BIB. Special study, theme, and estimation blocks will be discussed below.

Figure 2-3 lists the total number of items at each grade level in the main portion of the 1996 assessment. Of the total of 360 items, there were 194 unique multiple-choice items and 166 unique constructed-response items. Some of these items were used at more than one grade level. As a result, the sum of the items that appear at each grade level is greater than the total number of unique items.

Figure 2-3

Total Number of Items for the 1996 Mathematics Main Assessment


Grade 4
79 Multiple-Choice¹
58 Short Constructed-Response²
7 Extended Constructed-Response
Grade 8
92 Multiple-Choice¹
65 Short Constructed-Response²
8 Extended Constructed-Response
Grade 12
93 Multiple-Choice¹
66 Short Constructed-Response²
8 Extended Constructed-Response
50 Multiple-Choice
33 Short Constructed-Response
7 Extended Constructed-Response
37 Multiple-Choice
26 Short Constructed-Response
8 Extended Constructed-Response
52 Multiple-Choice
45 Short Constructed-Response
8 Extended Constructed-Response
14 Multiple-Choice
18 Short Constructed-Response
0 Extended Constructed-Response
26 Multiple-Choice
14 Short Constructed-Response
0 Extended Constructed-Response

[1] *These item counts include 15 multiple-choice questions that were presented at all three grades.*

[2] *These item counts include 7 short constructed-response questions that were presented at all three grades.*

In the development process, every effort was made to meet the content and process targets specified in the assessment framework. Tables 2-3, 2-4, and 2-5 show the approximate percentage of aggregate assessment items devoted to each content strand at each grade level. Percentages are based on the classifications agreed upon by NAEP's 1996 Mathematics Instrument Development Committee, and confirmed by independent reviewers.

Table 2-3

Distribution of Assessment Items for the Mathematics Assessment, Grade 4

	1990		1992		1996	
	Number of items	Percentage Of items	Number of items	Percentage of items	Number of items	Percentage of items
Content Strand						
Number Sense, Properties, and Operations	52	48%	63	40%	59	41%
Measurement	21	19%	31	20%	25	17%
Geometry and Spatial Sense	14	13%	27	17%	25	17%
Data Analysis, Statistics, and Probability	8	7%	20	12%	17	12%
Algebra and Functions	14	13%	17	11%	18	13%
Total	109	100%	158	100%	144	100%
Mathematical Ability						
Conceptual Understanding	42	39%	64	40%	61	42%
Procedural Knowledge	31	28%	31	20%	32	22%
Problem Solving	36	33%	63	40%	51	35%
Total	109	100%	158	100%	144	99%

Table 2-4

Distribution of Assessment Items for the Mathematics Assessment, Grade 8

	1990		1992		1996	
	Number of items	Percentage Of items	Number of items	Percentage of items	Number of items	Percentage of items
Content Strand						
Number Sense, Properties, and Operations	45	33%	58	32%	48	29%
Measurement	21	15%	32	17%	27	16%
Geometry and Spatial Sense	26	19%	36	20%	31	19%
Data Analysis, Statistics, and Probability	19	14%	28	15%	25	15%
Algebra and Functions	26	19%	29	16%	34	21%
Total	137	100%	183	100%	165	100%
Mathematical Ability						
Conceptual Understanding	59	43%	67	37%	57	35%
Procedural Knowledge	41	30%	45	24%	46	28%
Problem Solving	37	27%	71	39%	62	38%
Total	137	100%	183	100%	165	101%

Table 2-5
Distribution of Assessment Items
for the Mathematics Assessment, Grade 12

	1990		1992		1996	
	Number of items	Percentage Of items	Number of items	Percentage of items	Number of items	Percentage of items
Content Strand						
Number Sense, Properties, and Operations	37	26%	43	24%	41	25%
Measurement	23	16%	29	16%	23	14%
Geometry and Spatial Sense	24	17%	31	18%	27	16%
Data Analysis, Statistics, and Probability	22	15%	29	16%	34	20%
Algebra and Functions	38	26%	47	26%	42	25%
Total	144	100%	179	100%	167	101%
Mathematical Ability						
Conceptual Understanding	53	37%	70	39%	66	40%
Procedural Knowledge	48	33%	52	29%	51	31%
Problem Solving	43	30%	57	32%	50	30%
Total	144	100%	179	100%	167	101%

Before proceeding, it is worth saying a few words about the other assessment components. The estimation blocks were given to nationally representative samples of students at each grade. Estimation was not given at the state level. Students in the estimation sample took one block from the main BIB. In addition, they took two estimation blocks. Both estimation blocks were administered by a paced-tape method.[7] The first estimation block was all multiple-choice, and was carried forward intact from 1992. It contained 20 items at grade 4, and 22 items at grades 8 and 12. The second estimation block was newly developed for 1996. It contained 13 items at grade 4 (10 multiple choice and 3 constructed-response), 15 at grade 8 (9 multiple-choice), and 16 at grade 12 (all multiple-choice). Trend was measured on this assessment component.

Theme blocks were also given to nationally-representative samples at all grades. Students in the theme sample first completed one block from the main assessment BIB. Then they were administered one 30-minute theme block. These blocks called for in-depth examination of mathematical problems, and for the use of a variety of mathematics skills. At grade 4, the two theme blocks included a total of one multiple-choice question and 13 constructed-response items. At grade 8, the total was 8 multiple-choice items and 13 constructed-response items. At grade 12, the total was 8 multiple-choice items and 10 constructed-response exercises.

Finally, the advanced special studies were administered to samples of students meeting certain course-taking criteria at grades 8 and 12 (algebra or higher at grade 8, and calculus, precalculus, or algebra three at grade 12). Students took a linking block composed of exercises from the main assessment and then two 20-minute blocks (at grade 8) or two 30-minute blocks (grade 12) of advanced exercises. These blocks contained 9 multiple-choice and 13 constructed-response items at grade 8, and 7 multiple-choice and 15 constructed-response items at grade 12.

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[7] The blocks were paced so students had to estimate rather than calculate the answer.

2.4.8 Questionnaires

As part of the national assessment (as well as the State Assessment), a series of questionnaires was administered to students, teachers, and school administrators. Similar to the development of the cognitive items, the development of the policy issues and questionnaire items was a consensual process that involved staff work, field testing, and review by external advisory groups. A Background Questionnaire Panel drafted a set of policy issues and made recommendations regarding the design of the items. They were particularly interested in capitalizing on the unique properties of NAEP and not duplicating other surveys (e.g., the National Survey of Public and Private School Teachers and Administrators, the School and Staffing Survey, and the National Educational Longitudinal Study).

The Panel recommended a focused study that addressed the relationship between student achievement and instructional practices. The policy issues, items, and field test results were reviewed by the group of external consultants who identified specific items to be included in the final questionnaires. In addition, the Mathematics Instrument Development Panel and state representatives were consulted on the appropriateness of issues addressed in the questionnaires as they relate to mathematics instruction and achievement. The items underwent internal ETS review procedures to ensure fairness and quality and were then assembled into questionnaires.

⇒ Student Questionnaires

In addition to the cognitive items, the 1996 assessment included three student questionnaires; two sets of general and mathematics background items designed to gather contextual information about students, their instructional experiences in mathematics, and their attitudes toward mathematics, and one set of background items, given to students at the end of each booklet to determine their motivation in completing the assessment and their familiarity with assessment tasks. In order to ensure that all fourth-grade students understood the items and had every opportunity to respond to them, the three questionnaires were read aloud by administrators as fourth-grade students read along and responded in their booklets. Background questionnaires were not read aloud to eighth- and twelfth-grade students.

The **Student Demographics (common background) Questionnaire** included items about race/ethnicity, language spoken in the home, mother's and father's level of education, reading materials in the home, homework, attendance, which parents live at home, and which parents work. This questionnaire was the first section in every booklet. In many cases the items used were continued from prior assessments, so as to document changes in contextual factors that occur over time.

The second section of background items was the **Mathematics Background Questionnaire**. Categories of information represented in this section include:

> *Time Spent Studying Mathematics*: Students were asked to describe both the amount of instruction they received in mathematics and the time spent on mathematics homework.
>
> *Instructional Practices*: Students were asked to report their instructional experiences related to mathematics in the classroom, including group work, special projects, and writing in response to mathematics. In addition, they were asked about the instructional practices of their mathematics teachers and the extent to which the students themselves discussed what they did in class and demonstrated use of skills and strategies.

Attitudes Towards Mathematics: Students were asked a series of questions about their attitudes and perceptions about mathematics.

The **Student Motivation Questionnaire** asked students to describe how hard they tried on the NAEP mathematics assessment, how difficult they found the assessment, how many items they thought they got right, how important it was for them to do well, and how familiar they were with the assessment format.

⇒ Teacher, School, and SD/LEP Student Questionnaires

To supplement the information on instruction reported by students, the mathematics teachers of the students participating in the mathematics assessment were asked to complete a questionnaire about their instructional practices, teaching backgrounds, and characteristics. The teacher questionnaire contained two parts. The first part pertained to the teachers' background and general training. The second part pertained to specific training in teaching mathematics and the procedures the teacher uses for *each class* containing an assessed student, as well as collecting information on teachers' awareness and knowledge of the NCTM *Standards*.

The **Teacher Questionnaire, Part I: Background and General Training** included questions pertaining to gender, race/ethnicity, years of teaching experience, certification, degrees, major and minor fields of study, course work in education, course work in specific subject areas, amount of in-service training, extent of control over instructional issues, and availability of resources for their classroom.

The **Teacher Questionnaire, Part II: Training in Mathematics and Classroom Instructional Information** included questions on the teacher's exposure to various issues related to mathematics and teaching mathematics through pre- and in-service training, ability level of students in the class, whether students were assigned to the class by ability level, time on task, homework assignments, frequency of instructional activities used in class, methods of assessing student progress in mathematics, instructional emphasis given to the mathematics abilities covered in the assessment, and use of particular resources.

A **School Characteristics and Policies Questionnaire** was given to the principal or other administrator of each school that participated in the assessment. This information provided an even broader picture of the instructional context for students' mathematics achievement. This questionnaire included questions about background and characteristics of school principals, length of school day and year, school enrollment, absenteeism, dropout rates, size and composition of teaching staff, policies about grouping students, curriculum, testing practices and uses, special priorities and school-wide programs, availability of resources, special services, community services, policies for parental involvement, and school-wide problems.

The **SD/LEP Student Questionnaire** was completed by the teachers of students who were selected to participate in the assessment sample who were also identified as students with a disability (SD) or categorized as being of limited English proficiency (LEP). Some of these students were determined by the school to be ineligible to be assessed. In order to be excluded from the assessment, a student must have been identified as SD and must not have been mainstreamed at least 50 percent of the time, or was categorized as LEP. In addition, the school staff would have needed to determine that it was inappropriate to include the student in the assessment. This questionnaire asked about the nature of the student's disability or about the student's native language, and the special programs in which the student participated.

2.5 DEVELOPING THE SCIENCE ASSESSMENT

2.5.1 Overview

The science framework for the 1996 National Assessment of Educational Progress (NAEP) was produced under the auspices of the National Assessment Governing Board (NAGB). The consensus process was managed by the Council of Chief State School Officers (CCSSO) who worked with the National Center for Improving Science Education and the American Institutes for Research. Items were developed that were aligned with the specifications described in the framework and were extensively reviewed by specialists in science, measurement, and bias/sensitivity, as well as by government officials and state representatives.

The following sections include a detailed description of the development of the framework, objectives, and items for the 1996 NAEP science assessment. Section 2.5.8 describes the student background questionnaires and the science teacher questionnaire. Additional information on the structure and content of assessment booklets can be found in Chapter 4. Various committees worked on the development of the framework, objectives, and items for the mathematics assessment. The list of committee members and consultants who participated in the 1996 development process is provided in Appendix A.

2.5.2 Development of the Assessment Framework

NAGB is responsible for setting policy for NAEP; this policymaking role includes the development of assessment frameworks and test specifications. Appointed by the Secretary of Education from lists of nominees proposed by the Board itself in various statutory categories, the 26-member board is composed of state, local, and federal officials, as well as educators and members of the public.

The science framework for the NAEP 1996 assessment was developed over a 10-month period between October 1990 and August 1991. The following sections discuss how the specifications and items for science assessment were developed. The assessment instrument, the student assessment booklets, and the student, teacher, school, and SD/LEP questionnaires are also described.

A consensus process run by CCSSO was used to produce the science framework. This process involved two committees: a Planning Committee that conducted much of the actual framework development and a steering committee that provided policy and general guidance for the project. As general guidelines for the Planning Committee, the Steering Committee that recommended that the framework and ensuing science assessment have the following five characteristics:

- The framework should reflect the best thinking about the knowledge, skills, and competencies needed for a high degree of scientific understanding among all students in the United States. Accordingly it should encompass knowledge and use of organized factual information, relationships among concepts, major ideas unifying the sciences, and thinking and laboratory skills. In addition, the framework should be based on current understandings from research of teaching, learning, and students' performance in science.

- The framework and the assessment should address the nature and practices of knowing in science, as different from other ways of knowing; reflect the quantitative aspects of science as well as the concepts of life, earth, and physical sciences; deal with issues raised by the role of science and technology in society; include practical problem solving in science; take into account the developmental levels of students; and ensure that students with diverse backgrounds are assessed in ways that provide them with equal and fair opportunities to reflect their knowledge and performance.

- Assessment formats should be used that are consistent with the objectives being assessed. A variety of strategies for assessing student performance are advocated, including performance tasks that allow students to manipulate physical objects and draw scientific understandings from the materials before them; constructed-response items that provide insights into students' levels of understanding and ability to communicate in the sciences, as well as their ability to generate, rather than simply recognize information related to scientific concepts and their interconnections; and multiple-choice items that probe students' conceptual understanding and ability to connect ideas in a scientifically sound way.

- The assessment should contain a broad enough range of items at different levels of proficiency for identifying three achievement levels for each grade.

- Information on students' demographic and other background characteristics should be collected. Additional information should be collected from students, teachers and administrators about instructional programs and delivery systems, so that their relationships with student achievement can be ascertained and used to inform program and policy decisions.

A Planning Committee was established to identify goals and objectives and to produce the framework. This Planning Committee met monthly from November 1990 through April 1991 and was joined in the first meeting and final meeting by the Steering Committee, which reviewed and reacted to all framework drafts. During this development process, input and reactions were continually sought from a wide range of committee members both within the field of science and external to it. A list of committee members who participated in the developmental process is provided in Appendix A.

2.5.3 Framework for the 1996 Assessment

The framework for the 1996 science assessment is represented as a matrix with two dimensions represented by three fields of science (*earth science*, *physical science*, and *life science*) and three elements of knowing and doing science (*conceptual understanding*, *scientific investigation*, and *practical reasoning*). In addition, there are two overarching domains that describe science and nature of science and themes. Figures 2-4 to 2-6, respectively, describe the three fields of science, the elements of knowing and doing science, and the overarching domains.

Figure 2-4

Descriptions of the Three Fields of Science

Earth Science

The earth science component assessed centers on objects and events that are relatively accessible or visible. The concepts and topics covered are solid earth (lithosphere), water (hydrosphere), air (atmosphere), and the earth in space. The solid earth consists of composition; forces that alter its surface; the formation, characteristics, and uses of rocks; the changes and uses of soil; natural resources used by humankind; and natural forces within the earth. Concepts and topics related to water consist of the water cycle; the nature of oceans and their effects on water and climate; and the location of water, its distribution, characteristics, and effect of and influence on human activity. The air is broken down into composition and structure of the atmosphere (including energy transfer); the nature of weather; common weather hazards; and air quality and climate. The earth in space consists of setting of the earth in the solar system; the setting and evolution of the solar system in the universe; tools and technology that are used to gather information about space; apparent daily motions of the sun, the moon, the planets and the stars; rotation of the earth about its axis, the earth's revolution around the sun; and tilt of the earth's axis that produces seasonal variations in the climate.

Physical Science

The physical science component relates to basic knowledge and understanding concerning the structure of the universe as well as the physical principles that operate within it. The major sub-topics probed are matter and its transformations, energy and its transformations, and the motion of things. Matter and its transformations are described by diversity of materials (classification and types and the particulate nature of matter); temperature and states of matter; properties and uses of material (modifying properties, synthesis of materials with new properties); and resource management. Energy and its transformations involve different forms of energy; energy transformations in living systems, natural physical systems, and artificial systems constructed by humans; and energy sources and use, including distribution, energy conversion, and energy costs and depletion. Motion is broken down into an understanding of frames of reference; forces and changes in position and motion; action and reaction; vibrations and waves as motion; general wave behavior; electromagnetic radiation; and the interactions of electromagnetic radiation with matter.

Life Science

The fundamental goal of life science is to attempt to understand and explain the nature and function of living things. The major concepts assessed in life science are change and evolution, cells and their functions, organisms, and ecology. Change and evolution includes diversity of life on earth; genetic variation within a species; theories of adaptation and natural selection; and changes in diversity over time. Cells and their functions consists of information transfer; energy transfer for the construction of proteins; and communication among cells. Organism are described by reproduction, growth and development; life cycles; and functions and interactions of systems within organisms. The topic of ecology centers on the interdependence of life—populations, communities, and ecosystems.

Figure 2-5

Descriptions of Knowing and Doing Science

Conceptual Understanding

Conceptual understanding includes the body of scientific knowledge that students draw upon when conducting a scientific investigation or engaging in practical reasoning. Essential scientific concepts involve a variety of information including facts and events the student learns from science instruction and experiences with the natural environment and scientific concepts, principles, laws, and theories that scientists use to explain and predict observations of the natural world.

Scientific Investigation

Scientific investigation probes students' abilities to use the tools of science, including both cognitive and laboratory tools. Students should be able to acquire new information, plan appropriate investigations, use a variety of scientific tools, and communicate the results of their investigations.

Practical Reasoning

Practical reasoning probes students' ability to use and apply science understanding in new, real-word applications.

Figure 2-6

Descriptions of Overarching Domains

The Nature of Science

The nature of science incorporates the historical development of science and technology, the habits of mind that characterize these fields, and methods of inquiry and problem-solving. It also encompasses the nature of technology that includes issues of design, application of science to real-world problems, and trade-offs or compromises that need to be made.

(continued)

Figure 2-6 (continued)

Descriptions of Overarching Domains

Themes

Themes are the "big ideas" of science that transcend the various scientific disciplines and enable students to consider problems with global implications. The NAEP science assessment focuses on three themes: systems, models, and patterns of change.

- Systems are complete, predictable cycles, structures or processes occurring in natural phenomena. Students should understand that a system is an artificial construction created to represent, or explain a natural occurrence. Students should be able to identify and define the system boundaries, identify the components and their interrelationships and note the inputs and outputs to the system.

- Models of objects and events in nature are ways to understand complex or abstract phenomena. As such they have limits and involve simplifying assumptions but also possess generalizability and often predictive power. Students need to be able to distinguish the idealized model from the phenomenon itself and to understand the limitations and simplified assumptions that underlie scientific models.

- Patterns of change involve students' recognition of patterns of similarity and differences, and recognition of how these patterns change over time. In addition, students should have a store of common types of patterns and transfer their understanding of a familiar pattern of change to a new and unfamiliar one.

Table 2-6 summarizes the distribution of assessment time across the three fields of science—*earth*, *physical*, and *life*. These fields provide the basis for the content area scales.

Table 2-6

Percentage Distribution of Items by Grade and Field of Science as Specified in the NAEP Science Framework

Field of Science	Grade 4	Grade 8	Grade 12
Earth Science	33%	30%	33%
Physical Science	33%	30%	33%
Life Science	33%	40%	33%

Table 2-7 shows the distribution of assessment time by *knowing and doing science*.

Table 2-7
Percentage Distribution of Items by Grade and Knowing and Doing Science as Specified in the NAEP Science Framework

Knowing and Doing Science Elements	Grade 4	Grade 8	Grade 12
Conceptual Understanding	45%	45%	45%
Scientific Investigation	45%	30%	30%
Practical Reasoning	10%	25%	25%

A number of items that assess each of the fields of science and each of the ways of *knowing and doing science* also probe *nature of science* and *themes* (*systems, models*, and *patterns of change*). Table 2-8 shows the recommended and actual percentages of assessment time for these two overarching domains.

Table 2-8
Percentage Distribution of Items Devoted to Nature of Science and Themes as Specified in the NAEP Science Framework

Overarching Domains	Grade 4	Grade 8	Grade 12
Nature of Science	≥15%	≥15%	≥15%
Themes	33%	50%	50%

In addition to calling for coverage of the content and cognitive domains described above, the framework instructed that all students participating in NAEP take part in a scientific investigation or hands-on experiment. In addition, it indicated that at least 30 percent of students should complete portions of the assessment involving in-depth examination of certain themes or topics in science.

2.5.4 Developing the Cognitive Items

The 1996 assessment was designed to meet the content specifications elaborated in the framework. Because of the broad content and skills definitions included in the framework, and the need to assess hand-on and theme-based science skills, the exercise development effort was extensive. At each grade, enough blocks were field tested to support 13 operational blocks; each block was 20 minutes at grade 4 and 30 minutes at the older two levels.[8] In addition, other portions of the 1993 field test were used to develop exercises for a special study of students at grade twelve who had received advanced science training. Given the fact that the science assessment was delayed from 1994 until 1996, a supplemental field test was held in 1995 (exercises were developed for this field test in 1994). This round of exercise development was used to build extra exercises for the general science and advanced components of the assessment.

The development of cognitive items involved careful field testing, both locally and nationally, of grade-appropriate questions and tasks for the assessment. Items were selected from a pool of questions that were written by teachers from across the country as well as by science assessment specialists on staff at ETS. The framework stated that the assessment should include some performance-based questions and tasks that require students to reason and solve problems representing real-life applications of science. Final selections of items used in the 1996 assessment were approved by the Science Instrument Development Committee.

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[8] Most of the development and field testing were conducted during 1992 and 1993; supplemental development and field testing of general science blocks was conducted during 1994 and 1995.

The assessment included constructed-response (short and extended) and multiple-choice items. The decision to use a specific item type was based on a consideration of the most appropriate format for assessing the particular objective. Both types of constructed-response items were designed to provide an in-depth view of students' ability to communicate their understanding of important concepts in science. Short constructed-response items (scored with either a 2- or 3-level scoring rubric) were used when students needed to respond briefly in order to demonstrate full comprehension. Extended constructed-response items (scored with a 4- or 5-level scoring rubric) were used when the task required more thoughtful consideration of the problem and engagement in more complex reasoning processes. Some items also required diagrams, graphs, or calculations. It was expected that students could adequately answer the short constructed-response items in about two to three minutes and the extended constructed-response items in about five minutes. In addition, blocks of items were developed that required the manipulation of equipment (hands-on tasks) and others were developed that assessed each of the three themes: *systems, models,* and *patterns of change*. In the case of some of the hands-on blocks, compound items were created in which student responses to a variety of items were scored as a single item. Multiple-choice items were used when a straightforward, single correct answer was required.

A carefully developed and proven series of steps was used to create the assessment items. These steps are described earlier in the chapter under Section 2.3.

2.5.5 Development of the Operational Forms

Most of the items for the 1996 science assessment were field tested in February and March 1993; however, since the assessment was delayed from 1994 to 1996 an opportunity was afforded for further items to be field tested in February and March 1995. Each of these field tests involved students in many states and were intended to try out the cognitive items and hands-on-tasks and to give jurisdictions and contractors practice and experience with the proposed materials and tasks. Approximately 500 responses were obtained for each item in each field test.

The field test data were collected, scored, and analyzed in preparation for meetings with the Science Instrument Development Committee. The objectives that guided the review of these items were:

- to determine which items were most suitable for assessing understanding in science in accordance with the framework;
- to select items that displayed appropriate statistical attributes;
- to determine the need for revisions of items that lacked clarity, or had ineffective item formats;
- to determine appropriate timing for assessment items.

Committee members, ETS assessment staff, and NAEP staff reviewed the materials. Item analyses (which provided the percentage of correct responses, the biserial correlations for multiple-choice and items with a two-level scoring guides, and percentages of responses in each category or at each level of the scoring guide and the polyserial correlations for other constructed-response items) were used as a guide in identifying and flagging for further review those test items that were not measuring the intended objective well.

Once the committees had selected the items, they were rechecked for content, measurement, and sensitivity concerns. In addition, a meeting of representatives from state education agencies was convened to review the items chosen for the components of the operational assessment that were to be administered at the state level (that is, the grade 8 assessment). The federal clearance package containing 13 blocks of cognitive items was submitted to NCES in August 1993. A further clearance package containing two blocks of items was submitted to NCES in 1995. Throughout the clearance process, revisions were made in accordance with changes required by the government. Upon approval, the 15 blocks (assembled into booklets) and questionnaires were ready for printing in preparation for the assessment.

2.5.6 Distribution of Assessment Items

The science assessment developed for use in 1996 was organized according to a series of blocks, each containing a set of items. Some of the blocks were unique to a particular grade level. Other blocks were designed to be given to students in two grades (either 4 and 8 or 8 and 12).

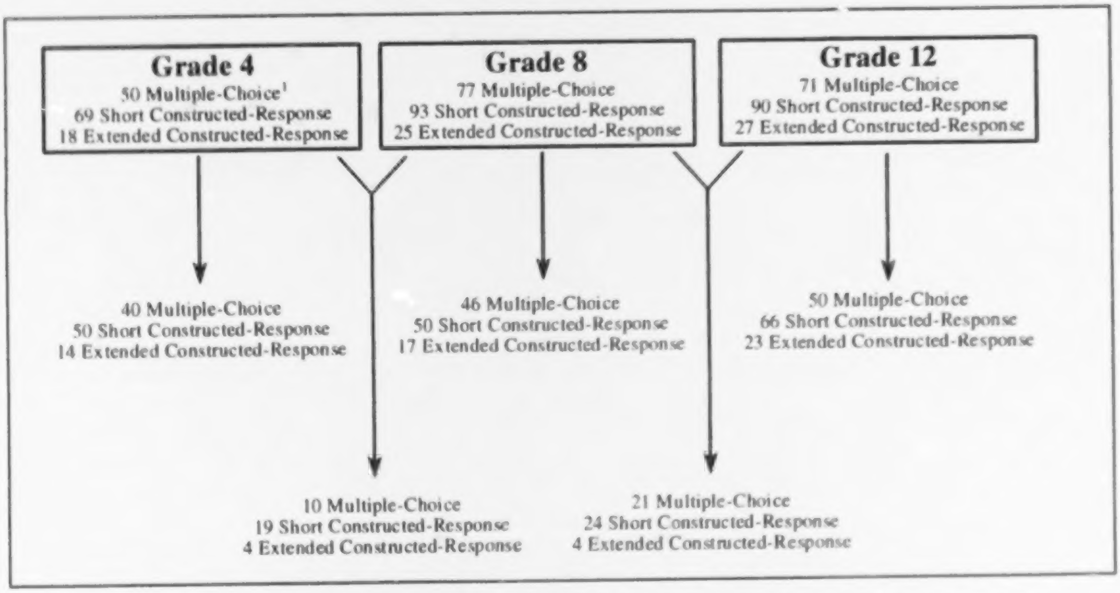
At each grade, the main component of the assessment used for the creation of reporting scales included fifteen different blocks of multiple-choice and constructed-response items (some with both regular and extended constructed-response items). These blocks each were 20-minutes long at grade four and thirty minutes at the other levels. Three 30-minute special study blocks targeted students in advanced mathematics courses. Of the 15 blocks at each grade that were used for the main assessment:

- four blocks at each grade level required students to complete a hands-on science task
- three blocks at each grade required students to work in-depth in a single thematic or topical area
- eight blocks at each grade covered general knowledge and concepts in the fields of science

Figure 2-7 lists the total number of items at each grade level in the 1996 assessment. Of the total of 438 items, there were 167 unique multiple-choice items and 271 unique constructed-response items that made up the 1996 science assessment. Some of these items were used at more than one grade level. As a result, the sum of the items that appear at each grade level is greater than the total number of unique items.

Figure 2-7

Total Number of Items for the 1996 Science Main Assessment


Grade 4
50 Multiple-Choice[1]
69 Short Constructed-Response
18 Extended Constructed-Response
Grade 8
77 Multiple-Choice
93 Short Constructed-Response
25 Extended Constructed-Response
Grade 12
71 Multiple-Choice
90 Short Constructed-Response
27 Extended Constructed-Response
40 Multiple-Choice
50 Short Constructed-Response
14 Extended Constructed-Response
46 Multiple-Choice
50 Short Constructed-Response
17 Extended Constructed-Response
50 Multiple-Choice
66 Short Constructed-Response
23 Extended Constructed-Response
10 Multiple-Choice
19 Short Constructed-Response
4 Extended Constructed-Response
21 Multiple-Choice
24 Short Constructed-Response
4 Extended Constructed-Response

[1] The percentage of time for multiple-choice items is low because the hands-on tasks and theme blocks contain very few multiple-choice items and take up 47% of the assessment time at each grade level.

Table 2-9 summarizes the distribution of assessment time across the three fields of science. Since these fields make up the core of the *Science Framework*, care has been taken to ensure the greatest possible congruence between the proportions used in the assessment and those indicated in the assessment specifications.

Table 2-9

Distribution of Assessment Time by Field of Science

	Earth Science	Physical Science	Life Science
Grade 4	33%	34%	33%
Grade 8	30%	30%	40%
Grade 12	33%	33%	34%

Table 2-10 summarizes the assessment in terms of percentage of time devoted to different cognitive domains. The classification of items into these domains was conducted by both ETS staff and members of the instrument development committee. Every effort was made to meet the specified targets.

Table 2-10

Distribution of Assessment Time Across Cognitive Domains (Knowing and Doing)

	Conceptual Understanding	Scientific Investigation	Practical Reasoning
Grade 4	45%	38%	17%
Grade 8	45%	29%	26%
Grade 12	44%	28%	28%

Exercises assessing each of the fields of science and each of the cognitive domains also probe three themes, (models, systems, and patterns of change), and the students' knowledge of the nature of science. Table 2-11 shows the distribution of assessment time devoted to themes, and Table 2-12 shows the distribution of assessment time devoted to the nature of science.

Table 2-11

Percentage of Assessment Time Devoted to Themes

	Actual	Recommended
Grade 4	53%[1]	30%
Grade 8	49%	50%
Grade 12	55%	50%

[1] Several of the hands-on tasks were classified as themes.

Table 2-12

Percentage of Assessment Time Devoted to Nature of Science

	Actual	Recommended
Grade 4	19%	≥15%
Grade 8	21%	≥15%
Grade 12	31%	≥15%

In addition to the main components of the assessment, an advanced study was conducted at grade 12. Students who were in their fourth year of high-school science were sampled. Each participant took a linking block made up of 17 exercises from the main assessment, and three special advanced blocks: one in biology, one in chemistry, and one in physics. Each of the advanced blocks contained seven multiple-choice and nine constructed-response items.

2.5.7 Questionnaires

As part of the national assessment (as well as the State Assessment), a series of questionnaires was administered to students, teachers, and school administrators. Similar to the development of the cognitive items, the development of the policy issues and questionnaire items was a consensual process that involved staff work, field testing, and review by external advisory groups. A Background Questionnaire Committee drafted a set of policy issues and made recommendations regarding the design of the items. They were particularly interested in capitalizing on the unique properties of NAEP and not duplicating other surveys (e.g., the National Survey of Public and Private School Teachers and Administrators, the School and Staffing Study, and the National Educational Longitudinal Study). The policy issues, items, and field test results were reviewed by the group of external consultants who identified specific items to be included in the final questionnaires. In addition, the Science Instrument Development Committee and state representatives were consulted on the appropriateness of issues addressed in the questionnaires as they relate to science instruction and performance. The items underwent internal ETS review procedures to ensure fairness and quality and were then assembled into questionnaires. The questionnaires were then submitted to the Office of Management and Budget (OMB) for approval.

⇒ Student Questionnaires

In addition to three blocks of cognitive items, each booklet in the assessment included three student questionnaires. Two of these were sets of general and science background questionnaires designed to gather contextual information about students, their instructional experiences in science, and their attitudes toward science. The third questionnaire was given to students at the end of each booklet to determine students' motivation in completing the assessment and their familiarity with assessment tasks.

The **Student Demographics (common background) Questionnaire** included questions about race/ethnicity, mother's and father's level of education, types of reading materials in the home, and school attendance.

The **Science Background Questionnaire** included questions that addressed the following.

Attitudes Towards Sciences: Students were asked a series of questions about their attitudes and perceptions about science.

Time Spent Studying Science: Students were asked to describe both the amount of instruction they received in science and the time spent on science homework.

Instructional Practices: Students were asked to report their instructional experiences related to science in the classroom, including group work, special projects, and writing in response to science. In addition, they were asked about the instructional practices of their science teachers.

The **Student Motivation Questionnaire** asked students how many questions they thought they got right on the NAEP science assessment, how difficult they found it, how hard they tried, how important it was for them to do well, and how often they wrote long answers on tests or assignments for science.

⇒ Teacher, School, and SD/LEP Student Questionnaires

To supplement the information on instruction reported by students, the science teachers of the students participating in the assessment were asked to complete a questionnaire that addressed teachers' background and general training as well as their science preparation and information concerning science instruction.

The **Teacher Questionnaire, Part I: Background and General Training** included questions about gender, race/ethnicity, years of teaching experience, certification, degrees, major and minor fields of study, course work in education, course work in specific subject areas, amount of in-service training, professional development activities, and availability of resources for their classroom.

The **Teacher Questionnaire, Part II: Science Preparation and Science Instructional Information** included questions on the number and types of science courses taken over the past two years, membership in science organizations, frequency of instructional activities such as asking students to prepare a written science report or an oral science report, emphasis on objectives such as developing science problem-solving skills, methods used to assess student progress in science, and ability level of students in class.

A **School Characteristics and Policies Questionnaire** was given to the principal of each school that participated in the assessment program. This questionnaire asked about background and characteristics of school principals, length of school day and year, school enrollment, absenteeism, drop-out rates, size and composition of teaching staff, policies about grouping students, curriculum, testing practices and uses, special priorities and school-wide programs, availability of resources, special services, community services, policies for parental involvement, and school-wide problems.

The **SD/LEP Student Questionnaire** was completed by the teachers of those students who were selected to participate in the assessment sample and were identified as students with a disability (SD) or were categorized as being of limited English proficiency (LEP). Some of these students were determined by the school to be ineligible to be assessed. In order to be excluded from the assessment, a student must have been identified as SD and must not have been mainstreamed at least 50 percent of the time, or was categorized as LEP. In addition, the school staff would have needed to determine that it was inappropriate to include these students in the assessment. This questionnaire asked about the nature of the student's disability or about the students' native language, and the special programs in which the student participated.

Chapter 3

SAMPLE DESIGN[1]

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Westat, Inc.

3.1 INTRODUCTION

The samples for the 1996 NAEP assessment were selected using a complex multistage sample design involving the sampling of students from selected schools within 94 selected geographic areas, called primary sampling units (PSUs), across the United States.

The long-term trend sample design had four steps in the selection process and the main sample design had five steps in the selection process:

1. selection of geographic PSUs (counties or groups of counties),
2. selection of schools within PSUs,
3. assignment of sample type to schools (main samples only),
4. assignment of session types to schools, and
5. selection of students for session types within schools.

The samples were drawn for the three different age classes,[2] and for each age class the samples were of two distinct types. The first type consisted of the cross-sectional or "main" samples, while the second type consisted of the long-term trend samples. The populations surveyed with each of these sample types are defined in Table 1-1 in Chapter 1. Separate samples of schools were required for the long-term trend samples and main samples, because of various differences in the calendar period for test administration, the format of the administration, the fact that the trend samples include age-based samples, whereas main samples do not and, in the case of age class 17, the grade definition of the population of interest. (See the description of Table 1-1 in Chapter 1.)

In addition to representing the respective populations as a whole, for the main samples there was oversampling of nonpublic schools, and of public schools with moderate or high enrollment of Black or Hispanic students (see Section 3.3). This oversampling was undertaken to increase the sample sizes of nonpublic-school students and minority students, so as to increase the reliability of estimates for these groups of students. These oversampling rates have been used in the past several rounds of NAEP. The oversampling rates were based on experience, after attempting to report results for these groups in assessments where no oversampling was used.

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[1] Ralph DiGaetano, Keith F. Rust, and Leslie Wallace were responsible for the design and implementation of the sampling process for the 1996 NAEP assessments.

[2] The term "age class" is used in this report when it is appropriate to discuss one of the three student cohorts in a general way (not necessarily in reference to a specific sample). For the 1996 assessment, age class 9 refers to age 9 or grade 4 long-term trend, or grade 4 main sample students; age class 13 refers to age 13 or grade 8 long-term trend, or grade 8 main sample students; and age class 17 refers to age 17 or grade 11 long-term trend, or grade 12 main sample students.

The overall assessment period fell into three time periods—fall, winter, and spring. Not all assessment components were conducted in each time period. Table 3-1 shows the relationship between the various sample components and the assessment periods. The sizes of the PSU and school samples and the procedures for their selection were determined by the assessment period, as well as by the population to be surveyed and the method of administration in each case.

Table 3-1

Assessment Type by Age Class and Assessment Period

Age Class/Assessment	Fall	Winter	Spring
9			
Main	—	1/3/96 - 3/29/96	—
Long-Term Trend	—	1/3/96 - 3/8/96	—
13			
Main	—	1/3/96 - 3/29/96	—
Long-Term Trend	10/9/95 - 12/22/95	—	—
17			
Main	—	1/3/96 - 3/29/96	—
Long-Term Trend	—	—	3/11/96 - 5/10/96

Special trend samples were required because:

- The long-term trend samples had different school and student eligibility requirements than the main samples. Both grade- and age-eligible students were targeted in long-term trend, and only grade-eligible students were targeted in the main samples. This meant that schools with any of several grades were eligible for long-term trend (grades 2 to 6 for age class 9, grades 6 to 9 for age class 13, and grades 9 to 12 for age class 17), while only schools with grades 4, 8, or 12 were eligible for the main samples.

- The conditions for administration of the assessment varied considerably between the main sample and long-term trend sample sessions.

- The need in the long-term trend samples for four distinct session types for age class 9 and 13 and three for age class 17, together with the need for up to six distinct session types for the main samples, made it not feasible to conduct both main sample sessions and long-term trend sessions in a given school. For long-term trend, the session types were spiral booklets 51-56 and tape booklets 91-93 for ages 9 and 13, and spiral booklets 51-56 and tape booklets 84-85 for age 17. For the main samples, the session types were mathematics, science, mathematics estimation, and mathematics theme at all grades (4, 8, and 12), advanced mathematics at grades 8 and 12, and advanced science at grade 12.

- For age classes 13 and 17, the main sample administrations were conducted in the winter; while the long-term trend sample administrations were conducted in the fall and spring respectively. The fall and spring administration periods match administration periods used in NAEP as far back as 1969-71.

This chapter gives details of the sample selection procedure, and information on the results of the sampling process. Further details are given in the report *The 1996 NAEP Sampling and Weighting Report* (Wallace & Rust, 1999).

3.2 PRIMARY SAMPLING UNITS

In the first stage of sampling, the United States (the 50 states and the District of Columbia) was divided into geographic primary sampling units (PSUs). The PSUs are those that were used beginning in 1994 and incorporate 1990 U.S. Census information. With a few exceptions, each PSU met a minimum size requirement (a 1990 U.S. Census population of at least 60,000 in the Northeast and Southeast and 45,000 in the Central and West regions) and comprised either a consolidated metropolitan statistical area (CMSA), a metropolitan statistical area (MSA), a single county, or (more likely in the case of nonMSA PSUs) a group of contiguous counties. In the case of New England MSAs, which are not formed from whole counties, the corresponding New England County Metropolitan Areas (NECMAs), which are defined in terms of whole counties, were designated as PSUs. The PSUs were designed to serve as the PSUs for NAEP samples from 1994 until 2002. Thus 1990 total population was used as a size measure, rather than 1990 school age population, as this was considered likely to correlate more highly with school age population over this period. Each PSU was contained entirely within one of the four NAEP regions defined in Table 3-2. These NAEP regions were used to stratify the PSUs, ensuring that each region was adequately represented in the various assessment samples.

Table 3-2
Geographic Regions Used for Stratification

Northeast	Southeast	Central	West
Connecticut	Alabama	Illinois	Alaska
Delaware	Arkansas	Indiana	Arizona
District of Columbia	Florida	Iowa	California
Maine	Georgia	Kansas	Colorado
Maryland	Kentucky	Michigan	Hawaii
Massachusetts	Louisiana	Minnesota	Idaho
New Hampshire	Mississippi	Missouri	Montana
New Jersey	North Carolina	Nebraska	Nevada
New York	South Carolina	North Dakota	New Mexico
Pennsylvania	Tennessee	Ohio	Oklahoma
Rhode Island	Virginia[1]	South Dakota	Oregon
Vermont	West Virginia	Wisconsin	Texas
Virginia[1]			Utah
			Washington
			Wyoming

[1] That part of Virginia that is part of the Washington, DC-MD-VA metropolitan statistical area at the time of the 1990 Census, is included in the Northeast region; the remainder of the state is included in the Southeast region.

In a few cases an MSA crossed region boundaries. Such MSAs were split into two or more PSUs as necessary (e.g., the Cincinnati OH-KY-IN MSA was split into the Cincinnati OH-IN PSU in the Central region and the Cincinnati KY PSU in the Southeast). Ninety-four PSUs were selected for the main samples and 52 PSUs were selected for the long-term trend samples, as described below.

For the main samples, the 22 largest PSUs were included with certainty. The inclusion of these PSUs in the sample with certainty provided an approximately optimum, cost-efficient sample of schools and students when samples were drawn within them at the required national sampling rate. The 22 largest PSUs by region were:

22 Largest PSUs by Region

Northeast:
- Baltimore, MD MSA
- Boston-Lawrence-Salem-Lowell-Brockton, MA NECMA
- New York-Northern New Jersey-Long Island, NY-NJ CMSA (excluding that part in CT)
- Philadelphia-Wilmington-Trenton, PA-NJ-DE-MD CMSA
- Pittsburgh-Beaver Valley, PA CMSA
- Washington, DC-MD-VA MSA

Southeast:
- Atlanta, GA MSA
- Miami-Fort Lauderdale, FL CMSA
- Tampa-St. Petersburg-Clearwater, FL MSA

Central:
- Chicago-Gary-Lake County, IL-IN-WI CMSA
- Cleveland-Akron, OH CMSA
- Detroit-Ann Arbor, MI CMSA
- Minneapolis-St. Paul, MN-WI MSA
- St. Louis, MO-IL MSA

West:
- Dallas-Fort Worth, TX CMSA
- Denver-Boulder, CO CMSA
- Houston-Galveston-Brazoria, TX CMSA
- Los Angeles-Anaheim-Riverside, CA CMSA
- Phoenix, AZ MSA
- San Diego, CA MSA
- San Francisco-Oakland-San Jose, CA CMSA
- Seattle-Tacoma, WA CMSA

The remaining smaller PSUs were not guaranteed to be selected for the sample. These were grouped into a number of noncertainty strata (so called because the PSUs in these strata were not included in the sample with certainty), and one PSU was selected from each stratum. The PSUs were classified into four regions, each containing about one-fourth of the U.S. population. These regions were defined primarily by state (Table 3-2). In each region, noncertainty PSUs were classified as MSA (metropolitan) or nonMSA (nonmetropolitan) according to 1990 definitions. The resulting major strata are shown in Table 3-3.

Table 3-3
The Sampling Major Strata
and the Number of Noncertainty Strata in Each

Region	Number of Strata for MSA PSUs	Number of Strata for NonMSA PSUs	Total Strata
Northeast	6	4	10
Southeast	12	12	24
Central	8	12	20
West	10	8	18
Total	36	36	72

Within each major stratum, further stratification was achieved by ordering the noncertainty PSUs according to several additional socioeconomic characteristics, yielding 72 strata. The number of such strata formed within each major stratum is shown in Table 3-3. The strata were defined so that the aggregate of the measures of size of the PSUs in a stratum was approximately equal for each stratum. The size measure used was the population from the 1990 Census. The characteristics used to define strata were the percent minority population, the percentage change in total population since 1980, the per capita income, the percent of persons age 25 or over with college degrees, the percent of persons age 25 or over who completed high school, and the civilian unemployment rate. Up to four of these characteristics were used in any one major stratum. For each major stratum, the characteristics used were chosen by modeling PSU-level mean reading proficiency scores for 1988, 1990, and 1992. The characteristics chosen were the best predictors of PSU-level mean reading proficiency scores in these models. One PSU was selected with probability proportional to size from each of the 72 noncertainty strata. That is, within each stratum, a PSU's probability of being selected was proportional to its population. The PSUs were selected with probability proportional to size (PPS) with the twin aims of obtaining approximately self-weighting samples of students, and having approximately equal workloads in each PSU.

Samples of 94 PSUs each were drawn for the 1994, 1996, 1998, 2000, and 2002 main samples simultaneously. They were drawn to minimize overlap of the PSUs from one assessment to the next, except that certainty PSUs were retained in each assessment year, and some of the larger noncertainty PSUs are in the sample for more than one of these assessment years. Each main sample of 94 PSUs was drawn from a population of about 1,000 PSUs. Primarily because of the use of MSAs as PSUs, PSUs varied considerably as to their probability of selection, since they varied greatly in size. In 1996, the 36 selected noncertainty MSA PSUs had probabilities of selection ranging from 0.04 to 0.58, while the 36 selected nonMSA PSUs had probabilities ranging from 0.03 to 0.08. Parts of 43 states were included in the main sample PSUs.

For the long-term trend samples, 52 PSUs were selected. The long-term trend samples were much smaller than the main samples and used separate field staff. Fewer PSUs were used for the long-term trend samples to avoid having the sample spread too thinly across PSUs. The long-term trend PSUs were drawn for 1994, 1996, 1998, 2000, and 2002 to minimize overlap of the trend PSUs from one assessment to the next, and to minimize overlap between trend and main samples within the same assessment.

The 10 largest main sample certainty PSUs were also included with certainty in the long-term trend samples. Six additional PSUs were selected systematically and with probability proportional to the 1990 population from the 12 remaining main sample certainties. Finally, 36 PSUs were selected from the 72 noncertainty strata so that the overall procedure was equivalent to systematic sampling with probabilities proportional to the 1990 population. The 72 noncertainty strata from the main sample design were paired, and one PSU per pair was selected for the trend samples. Note that the noncertainty long-term trend PSUs are not a subsample of the noncertainty main sample PSUs, in order to minimize the burden on a given school district in any one year.

3.3 SELECTION OF SCHOOLS

In the second stage of sampling, the public schools (including Bureau of Indian Affairs (BIA) schools and Department of Defense Education Activity (DoDEA) schools) and nonpublic schools (including Catholic schools) were listed according to the grade ranges associated with the three age classes. The lists of schools were obtained from two sources. Regular public, BIA, and DoDEA schools were obtained from the 1994 list of schools maintained by Quality Education Data, Inc. (QED). Regular public schools are schools with students who are classified as being in a specific grade (as opposed to schools having only "ungraded" classrooms). This includes statewide magnet schools and charter schools. Catholic and other nonpublic schools were obtained from both QED and the Private School Survey (PSS) developed for the National Center for Education Statistics' 1993-1994 School and Staffing Survey. The majority of the PSS list comes from complete enumeration of schools, but a small portion of the PSS list was restricted to a sample of counties selected for the survey. Certain PSS counties, generally large in population, were also included, independently by chance, in the NAEP sample PSUs. The schools from such counties were added to the NAEP sampling frame after steps were taken to eliminate duplicates with the QED list of nonpublic schools. In previous years, nonpublic schools were also obtained from telephone directories. This process was not repeated in 1996 because the use of the PSS files supplanted the need for this supplement.

Table 3-4 shows the numbers of schools included in the various sampling frame components. The population of eligible schools for each age class was restricted to the selected PSUs. Main sample schools were selected from the 94 main sample PSUs and long-term trend schools were selected from the 52 long-term trend PSUs. Note that there are relatively large numbers of nonpublic schools that are listed in the QED or PSS only. The discrepancy between the schools contained in the PSS dataset versus those in the QED dataset is primarily due to two factors: (1) the relative outdatedness of the two school lists, and (2) PSS's inclusion of a special area supplement designed to find schools not normally available on lists.

Table 3-4

Grade Definition of School Eligibility for Sampling Frame Inclusion and Frame Sizes, Main and Long-Term Trend Samples[1]

Sample[2]	Sampling Frame Included Schools With Any of Grades	Public[3]	Nonpublic from QED Only[4]	Nonpublic from PSS Only[4]	Nonpublic from QED and PSS[4]
Main Samples					
Grade 4	4	18,046	1,308	1,716	7,300
Grade 8	8	6,093	1,029	1,322	6,409
Grade 12	12	4,357	578	869	2,474
Long-Term Trend Samples					
Age Class 9	2 - 5	15,873	1,147	1,600	6,019
Age Class 13	6 - 9	13,667	1,089	1,474	6,592
Age Class 17	9 - 12	3,495	491	829	2,106

[1] The numbers in this table reflect the full samples, including all sample types (see Section 3.4).

[2] "Age Class" is a term that refers to either an age or a grade definition of the samples. For the 1996 main assessments, unlike for previous main assessments, only grade samples were drawn. Long-term trend age class definitions vary by subject area. They are explained more fully in Chapters 14 through 17.

[3] Public, BIA, and DoDEA schools

[4] Catholic and other nonpublic schools

Any school having one or more of the eligible grades, and located within an appropriate PSU, was included in the sampling frame of schools (the list of schools from which the samples of schools were drawn) for a given sample. For each age class in the long-term trend samples, only a fraction of one percent of age-eligible students was enrolled in ineligible schools. An independent sample of schools was selected for each of the age classes, separately for main and long-term trend. Thus, some schools were selected for assessment of two age classes, and a few were selected for all three. For all three age classes, a sample of schools was first drawn for the long-term trend assessments. The schools selected for long-term trend at a particular age class were excluded from the sampling frame when the samples of schools for the corresponding grade were drawn for the main assessments. In addition, the schools selected for the 1996 NAEP State Assessment program at grade 8 were excluded from the sampling frame for the main samples at that grade. In regard to both of these situations, adjustments were made to the sampling weights to reflect the appropriate probabilities of selection to yield unbiased estimates for both long-term trend and main samples.

For each NAEP sample, schools were selected (without replacement) across all PSUs with probabilities proportional to assigned measures of size. In those certainty PSUs included in both main and trend samples, the probability of selection for long-term trend for any school in a given age class was capped at 0.5, to ensure that adequate schools remained to be selected for the main sample. For long-term trend samples, the measure of size used for each school was the estimated number of age eligible students in the school, since for each age class the large majority of students selected were assigned to sessions for which only students of the appropriate age were eligible. In most schools having the modal grade, some additional students were selected who were in the modal grade but not age-eligible, so that the maximum sample size of students within a school was about 80 grade- and age-eligible students. Equal measures of size were assigned to schools containing estimates of age-eligible students ranging from 20 to 60 for each age class. Schools with more than 60 age-eligible students were selected with probabilities proportional to the measure of size. Schools with fewer than 20 estimated age-eligible students were assigned somewhat lower measures of size, and thus lower probabilities of selection, since assessment in these schools involved substantially higher per-student administrative costs.

For the main samples, equal measures of size were assigned to schools containing estimates of grade-eligible students ranging from 20 to 120 (for grade 4), 20 to 150 (for grade 8), or 20 to 180 (for grade 12). Schools larger than the indicated maximum size were selected with probabilities proportional to the measure of size. This procedure was used so as to obtain approximately self-weighting samples of students (i.e., students selected with approximately equal overall probabilities) at each grade. Three variations to the overall goal of self-weighting samples were implemented. Schools with fewer than 20 estimated grade-eligible students were assigned somewhat lower measures of size, and thus lower probabilities of selection. This was designed to increase cost efficiency. Each public school designated as high-minority (with over 10 percent Black and/or Hispanic enrollment for grades 4 and 8, or over 15 percent Black and/or Hispanic enrollment for grade 12) was given double the probability of selection of a public school, not designated high-minority, of similar size in the same PSU. Such high-minority schools were oversampled in order to enlarge the sample of Black and Hispanic students, thereby enhancing the reliability of estimates for these groups. For a given overall size of sample, this procedure reduces somewhat the reliability of estimates for all students as a whole and for those not Black or Hispanic. Each nonpublic school was given triple the probability of selection of a public school not designated high-minority of similar size in the same PSU. These greater probabilities of selection were used to ensure adequate samples of nonpublic-school students in order to allow the derivation of reliable estimates for such students. No subgroups (high minority schools or nonpublic schools) were oversampled in the long-term trend samples.

The total number of schools selected for each age class in both the long-term trend and main samples was such that the predesignated student sample sizes would be achieved by selecting all eligible students in a selected school, up to the maximum sizes indicated above. The target sample size also allowed for losses due to nonparticipation of selected schools and students and the exclusion of students from the assessment. This design, with the important exceptions described above, had the goal of yielding a sample of students in a given age class or grade with approximately uniform probabilities of selection. The efforts to oversample nonpublic-school students and minority students in the main samples and the practical constraints on the sample size within each school resulted in some substantial violations of this general goal. The distributions of selection probabilities of the selected students, as reflected in their sampling weights, are mentioned in Chapter 10.

The QED files do not contain schools that opened between 1994 and the time of the assessments. Therefore, special procedures were implemented to be sure that the NAEP assessment represented students in new public schools. Small school districts, which generally contained only one eligible school for a given age class, were handled differently from large school districts, which generally contained more than one eligible school for a given age class. In small school districts, the schools selected for a given age class were thought to contain all students in the district that were eligible for the assessment. Districts containing such schools in the school sample were asked if other schools with the appropriate grades for the assessment existed, and if so, they were automatically included in the assessment. For large school districts, a district-level sampling frame was constructed from the schools on the QED file that were eligible for one of the national assessments. Then districts were sampled systematically with probabilities proportional to a measure of size. In most cases, the measure of size was total district enrollment, but a minimum measure of size was used in districts below a certain cutoff. Each sampled district was asked to update lists of eligible schools according to information on the QED files. Sampling frames of eligible new schools for these large districts were then constructed separately for both main and long-term trend samples at each age class, and separate samples of new schools were selected systematically with probability proportional to eligible enrollment using the same sampling rates as for the original sample. Seven new schools were added to the main samples: two at grade 4, three at grade 8, and two at grade 12. Four new schools were added to the long-term trend samples: one at age class 9, three at age class 13, and none at age class 17. Although new school sampling procedures were applied at age class 17, no new schools were selected since schools with the necessary characteristics were not available. All new schools added to the sample were obtained from large districts.

In a few PSUs where school refusals were relatively heavy for a particular sample, substitute school selections were made, replacing the refusals (to the extent feasible) with schools from within the same PSU and similar in size, affiliation (public, Catholic, or other nonpublic), grade span, and minority composition. The goal of this procedure was to maintain the student sample sizes needed, while keeping variance and nonresponse bias at acceptable levels. For the main samples, 31 substitute schools were selected using this procedure (10 at grades 4 and 8, and 11 at grade 12), and 28 substitute schools were selected for the long-term trend samples (15 at age class 9, 7 at age class 13, and 6 at age class 17). Tables 3-5 and 3-6 show the number of in-scope schools selected, cooperating, and substituted, in the main and long-term trend samples, respectively. The participation rates given are based on the original sample of schools (excluding substitutes). School participation rates for grade 8 and nonpublic schools in the main samples appear lower compared to those achieved in 1994, while the rates for public schools appear higher. The other response rates are comparable for the two years. Note that since the response rates quoted do not include the substitute selections, the potential for nonresponse bias is likely to be a little less than these rates would indicate. This is because the substitute selections were chosen based on their similarity to the initially refusing selections.

For the main samples, the schools that were participating with no eligible students left for testing had all of their eligible students tested for State NAEP, so that no students were left for the main samples. These schools were accounted for by treating them as nonrespondents for weighting. For long-term trend at age class 13, the considerable numbers of schools selected with no eligible students enrolled resulted primarily from the fact that some schools with grades 6, 7, or 9, but no grade 8, were sampled. Such schools had a reasonable chance of containing some age 13 students. Often they did have a number of eligible students, but sometimes they had none. Because of the grade structure of schools, this occurred most often for age class 13.

Table 3-5

School Sample Sizes, Refusals, and Substitutes for the Main Samples[1]

Status	Grade 4	Grade 8	Grade 12	Total	Public[2]	Nonpublic[3]
Selected, in scope	723	761	779	2,263	1,392	871
Refusals	99	127	160	386	212	174
Participation rate of originally selected schools	86%	83%	79%	83%	85%	80%
1994 participation rate	86%	86%	79%	83%	82%	85%
Participating, no eligible students enrolled	0	0	1	1	0	1
Participating, no eligible students left for testing[4]	20	42	27	89	30	59
Substitutes participating	1	1	2	4	4	0
Final assessed sample	605	593	593	1,791	1,154	637

[1] The numbers in this table reflect the full samples, consisting of schools in the S1, S2, and S3 samples. These sample types are described in Section 3.4.

[2] Public, BIA, and DoDEA schools

[3] Catholic and other nonpublic schools

[4] No students were left for testing because they had been tested in the State Assessment

Table 3-6

School Sample Sizes, Refusals, and Substitutes for the Long-Term Trend Samples[1]

Status	Age Class 9	Age Class 13	Age Class 17	Total
Selected, in scope	291	316	237	844
Refusals	43	51	44	138
Participation rate of originally selected schools	85%	84%	81%	84%
1994 participation rate	87%	82%	81%	83%
Participating, no eligible students enrolled	8	27	2	37
Substitutes participating	8	4	0	12
Final assessed sample	248	242	191	681

[1] The numbers in this table reflect the full samples, consisting of schools in the S1, S2, and S3 samples. These sample types are described in Section 3.4.

3.4 ASSIGNMENT OF SAMPLE TYPE TO SCHOOLS

In order to determine the effect of using different criteria for including students with disabilities and limited English proficient students in the assessment, three different sample types were assigned to the schools selected for the main assessment. In sample type 1 (S1) schools, the inclusion criteria for the main samples were identical to those used in 1990 and 1992 and were intended to be somewhat more rigorously defined than those used in the long-term trend samples. In sample type 2 (S2) schools, new 1996 inclusion criteria were used. In sample type 3 (S3) schools, the new 1996 inclusion criteria were used and accommodations were offered to students with disabilities (SD) and students of limited English proficiency (LEP). For more details of the inclusion criteria and their implementation, and the accommodations offered students, see Chapter 5. The information in this chapter and in Chapter 5 applies to all three sample types or subsamples.

Sample type was assigned to schools separately for each grade. For schools that were not also selected for the State Assessment program, sample type was assigned as follows. At grade 4, 20 percent of the schools were assigned sample type 1, 45 percent were assigned sample type 2, and 35 percent were assigned sample type 3. At grade 8, one-sixth of the schools were assigned sample type 1, and five-twelfths each were assigned sample types 2 and 3. At grade 12, two-thirteenths of the schools were assigned sample type 1, six-thirteenths were assigned sample type 2, and five-thirteenths were assigned sample type 3. Sample type was assigned so that a variety of schools with respect to region, school type, urbanization, and size were in each sample type at each grade.

For schools selected for both the main samples and State Assessment program, sample type was initially assigned as described above, and then reassigned for the main samples as follows. Schools retained their initial sample type assignment for the State Assessment. For the national assessment, schools were ultimately assigned the same sample type as for the State Assessment, with one exception. Schools that were initially assigned to sample type 3 for the national assessment and sample type 2 for the State Assessment, retained these different respective sample types for each assessment. For all other schools, the sample type for the main samples was switched to match the state sample type. The effect of this procedure was to assign sample type 1 to somewhat more schools and sample types 2 and 3 to somewhat fewer schools at grades 4 and 8 than initially assigned.

3.5 ASSIGNMENT OF SESSIONS TO SCHOOLS

Sessions were assigned to the selected schools found to be in-scope at the time of session assignment in the following manner. First, the number of sessions per school was established (three sessions per school were specified for the long-term trend samples and for sample type 1 for the main samples. Five sessions per school were specified for sample types 2 and 3 for the main samples at grades 4 and 8, and six sessions per school were specified for sample types 2 and 3 for the main samples at grade 12). This was the maximum number of sessions that could be administered without creating unduly small session sizes with few eligible students. Thus, in most long-term trend schools, for example, three sessions were conducted. However, schools with fewer than 20 eligible students were asked to conduct only a single session.

Session types associated with each sample are listed in Table 3-7. In the main samples, four to six different session types were conducted at each grade (mathematics, science, mathematics estimation, and mathematics theme at all grades; advanced mathematics at grades 8 and 12; and advanced science at grade 12). All of the session types were not offered for all samples. For long-term trend, four session types were conducted at age classes 9 and 13 (spiral plus three tape sessions), and three session types were conducted at age class 17 (spiral plus two tape sessions). Schools could be assigned multiple sessions of the same type (for example, two spiral and one tape sessions in long-term trend, or three mathematics and three science sessions in the main samples).

Sessions were assigned to schools with three aims in mind. The first was to distribute students to the different session types across the whole sample for each age class so that the target numbers of assessed students would be achieved (in each sample type separately in the main assessments). The second was to maximize the number of different session types that were administered within a given selected school, without violating the minimum session sizes discussed above. The third was to give each student an equal chance of being selected for a given session type regardless of the number of sessions conducted in the school.

3.6 SAMPLING STUDENTS

To facilitate the sampling of students, a consolidated list was prepared for each school of all grade-eligible and age-eligible students (for long-term trend) or all grade-eligible students (for the main assessments) for the age class for which the school was selected. A systematic selection of eligible students was made from this list (unless all students were to be assessed) to provide the target sample size. For schools assigned more than a single session type (the vast majority), students were assigned by Westat district supervisors to one of the various session types using specified procedures.

For each age class, separately for the long-term trend and main samples, maxima were established as to the number of students who would be selected for a given school. In those schools that, according to information on the sampling frame, had fewer eligible students than the established maxima, each eligible student enrolled at the school was selected in the sample for one of the sessions assigned to the school. In other schools, a sample of students was drawn, and then students were assigned to sessions as appropriate. For the main samples, the maximum sample sizes were established by sample type in terms of the number of grade-eligible students: 72 at grades 4 and 8, and 90 at grade 12 for sample type 1; 120 at grade 4, 160 at grade 8, and 180 at grade 12 for sample types 2 and 3. For the long-term trend samples, the maximum at each age class was 60 age-eligible students (about 80 grade- plus age-eligible students in most schools). Note that the number of students actually selected for assessment in a long-term trend sample school generally fell somewhat below 80, because students who were selected for one of the long-term trend tape-administered sessions and were in the modal grade but not age-eligible were subsequently dropped from the sample. Similarly, in the main assessments, at grades 8 and 12 in sample types 2 and 3, students selected for the advanced mathematics and advanced science assessments, who were subsequently found to be ineligible on the basis of their courses taken, were dropped from the samples. This reduced the sample size somewhat in these schools.

The sample of students to be selected in each school was derived in the following manner, both for main and for long-term trend samples. On the basis of data obtained from the school characteristics and policies questionnaire (or the sample frame when the questionnaire data were not obtained in time) an estimate of the number of eligible students was established for each school. For the main samples, the estimated number of grade-eligible students was used; for the long-term trend samples, the number of age-eligible students was used. A Session Assignment Form was generated for each school, showing the line numbers (described below) of the students to be selected, indicating the type of session to be taken by each such student. These line numbers were generated using a sampling interval designed to give the appropriate sample size for each school. Thus, the overall sampling interval was 1.0 for schools in which all eligible students were to be assessed. The appropriate sampling interval was specified for schools with larger numbers of eligible students, such as to give the appropriate maximum sample size (described above for each age class) in the case that the school had an enrollment of eligible students exactly equal to that predicted.

If the Westat supervisor found that, when applied to the numbered list of eligible students assembled in the field for each school, the line numbers generated gave rise to a sample in excess of 120 percent of the appropriate maximum sample size limit specified above, he or she called Westat's central office. By use of a personal computer, new line numbers based on the actual number of eligible students were generated and relayed to the supervisor. A similar revision to the line numbers was made in the case of a school with a sampling interval in excess of 1.0, and eligible enrollment less than 80 percent of that initially estimated. In this latter case, the sample size was increased to the appropriate level. This procedure gave a suitable compromise between control over the sampling rate within each school and operational autonomy and flexibility for Westat field supervisors. Note that in all cases, sampling intervals were generated in Westat's central office, and stored for use in sample weighting. Supervisors were not required to derive or record within-school sampling rates.

Table 3-7 shows the number of students per school who were assessed for each assessment. Note that, for the various print samples, the number of students assessed per item per school is quite low, even though typically dozens of students were assessed in total in a particular school. Thus, the extent of clustering of the sample is in general quite modest, because most sampled schools conducted a few different assessments with a moderate number of students in each, and more importantly because the use of BIB-spiraling in the print-administered sessions greatly alleviated the effects of clustering the samples of students within schools, for item-level data.

Table 3-7

Number of Students Per School for Each Session Type[1]

Sample	Session Type	Number of Assessed Students	Number of Schools	Mean Number of Students Per Assessment Per School	Mean Number of Students Per Item Per School
Age Class 9 Long-Term Trend	Print Booklets 51-56	5,019	215	23.3	3.9 - 7.8[2]
	Tape Booklet 91	1,852	127	14.6	14.6
	Tape Booklet 92	1,721	116	14.8	14.8
	Tape Booklet 93	1,840	125	14.7	14.7
Grade 4 Main	Print Mathematics	10,830	445	24.3	5.6
	Print Science	11,578	421	27.5	4.5 - 7.4[2]
	Tape Mathematics Estimation	2,115	120	17.6	17.6
	Print Mathematics Theme	4,004	230	17.4	8.7
Age Class 13 Long-Term Trend	Print Booklets 51-56	5,493	221	24.9	4.1 - 8.3[2]
	Tape Booklet 91	1,928	128	15.1	15.1
	Tape Booklet 92	1,866	125	14.9	14.9
	Tape Booklet 93	1,864	124	15.0	15.0
Grade 8 Main	Print Mathematics	11,521	411	28.0	6.5
	Print Science	11,971	346	34.6	5.6 - 9.4[2]
	Tape Mathematics Estimation	2,244	104	21.6	21.6
	Print Mathematics Theme	4,227	175	24.2	12.1
	Print Advanced Mathematics	2,365	253	9.3	9.3
Age Class 17 Long-Term Trend	Print Booklets 51-56	4,669	186	25.1	4.2 - 8.4[2]
	Tape Booklet 84	1,848	133	13.9	13.9
	Tape Booklet 85	1,691	122	13.9	13.9
Grade 12 Main	Print Mathematics	10,660	430	24.8	5.7
	Print Science	11,481	401	28.6	4.6 - 7.7[2]
	Tape Mathematics Estimation	1,889	96	19.7	19.7
	Print Mathematics Theme	3,860	196	19.7	9.8
	Print Advanced Mathematics	2,965	207	14.3	14.3
	Print Advanced Science	2,431	222	11.0	11.0

[1] The numbers in this table reflect the full samples, consisting of schools in the S1, S2, and S3 samples. These sample types are described in Section 3.4.

[2] This number varied because some item blocks appeared more than others in the set of booklets used for this sample.

3.7 OVERSAMPLING OF SD/LEP STUDENTS FOR MAIN SAMPLE MATHEMATICS AND SCIENCE ASSESSMENTS

As noted earlier, in the main assessments for mathematics and science, the procedures for assessing SD and LEP students varied by sample type. The inclusion procedure used in sample type 1 differed somewhat from that used in sample types 2 and 3. SD/LEP students in sample type 3 were offered accommodations not available to other students or to SD/LEP students in other sample types.

As a measure to ensure an adequate sample size of SD/LEP students from both sample types 2 and 3, oversampling procedures were applied for SD/LEP students at all three grades, in sample types 2 and 3 for mathematics, and in sample type 3 for science. In this way, comparisons of the effect of offering accommodations to students would have enhanced power to detect effects.

The procedure for carrying out the oversampling was somewhat different for grade 4 than for grades 8 and 12. This was because of the presence of the advanced mathematics and advanced science samples at grades 8 and 12 only, which offered an opportunity to oversample in a way not possible at grade 4. The general intent of the oversampling was, within each school assigned sessions of regular mathematics in sample types 2 and 3, and regular science in sample type 3, to select SD/LEP students for these assessments at twice the rate at which non SD/LEP students were sampled (or to include all SD/LEP students if there were not sufficient numbers to permit sampling at twice the rate). There was no oversampling of schools as part of the procedure.

At grade 4, the procedure was as follows. In each school where oversampling was to occur, the initial desired sample of students was drawn for each session assigned, from the full list of eligible students. Among those students not selected for any sessions in this way, the SD/LEP students were identified. A sample from among these was drawn, using a sampling rate that would achieve the double sampling rate required overall. In most cases, this involved selecting all such SD/LEP students in the school. If the school was a sample type 3 school assigned to assess both mathematics and science, the extra SD/LEP students so selected were split among mathematics and science in the same proportion as the initial student sample for the school. Thus, if the school was assigned two sessions of science and one of mathematics, two-thirds of these extra SD/LEP students were assigned to science, and one-third to mathematics.

The sampling of additional SD/LEP students was carried out using designated line numbers, indicated on the session assignment form used to generate the samples of students in each school. In this way, the necessary information as to the selection probability of each student was retained for use in weighting. No reliance was placed on information generated in the field. Field supervisors had only to follow the prespecified sampling instructions.

At grades 8 and 12, a different approach was taken. As a result of the pattern of assigning sessions to schools, it was the case that in every school in which there were students remaining who were not selected for assessment in the initial sampling phase (so that there were in fact SD/LEP students available for oversampling), a session of either advanced mathematics, or advanced science (at grade 12), was assigned. This was the result of the scheme for assigning sessions to schools efficiently; it was not a condition imposed in order to facilitate oversampling. The SD/LEP students assigned as an oversample for the regular mathematics and (in the case of sample type 3) science assessments were those SD/LEP students who were initially selected for the advanced mathematics and science samples, but who were not eligible for those assessments because they had not taken the appropriate set of courses. Thus, for grades 8 and 12, the oversampling of SD/LEP students took place only among that subpopulation that was not eligible for the advanced assessments.

It was assumed that there would be relatively few SD/LEP students who would qualify for the advanced sessions, since nationally about 20 percent of all students were so eligible. To the extent to which there were SD/LEP students who qualified for the advanced mathematics and science assessments, however, the oversampling procedure for regular mathematics and science was not biased, because this was taken into account in the weighting of the regular mathematics and science assessments. This was possible because, for the students in the regular mathematics and science samples, those who were SD/LEP were identified, and those who qualified for the advanced assessments were also identified.

All such additional SD/LEP students were included unless this would have led to the sampling rate of SD/LEP students within the school being more than twice the rate of other students. In such cases, a random subsample of the extra SD/LEP students was selected. As for grade 4, all information needed in the field to carry out the oversampling was contained on the preprogrammed Session Assignment Form, so that the complex weighting process could be carried without the possibility of error being introduced in sampling information obtained from the field. Also, as in grade 4, in sample type 3 schools that were assigned both regular mathematics and regular science sessions, the extra SD/LEP students sampled were assigned in the appropriate proportions.

Since the aim was to oversample by a factor of two where possible, the overall rate of oversampling of SD/LEP students was instead less than two. That is because in smaller schools there were no students remaining who had not already been assigned to a session. Again, the weighting procedures ensured that the results were not biased as a result of the relative under representation of SD/LEP students from smaller schools.

Table 3-8 shows the results of the oversampling efforts for each grade and sample type for mathematics and science. The weighted results show the proportion of the sample that would have been SD/LEP students had no oversampling been attempted. The focus should be on sample types 2 and 3 for mathematics and sample type 3 for science, since this is where the oversampling of SD/LEP students occurred. The extent to which the unweighted percentage of SD/LEP students exceeds the weighted percentage is a measure of the effectiveness of the oversampling. As can be seen, the procedure was effective in increasing the sample of SD/LEP students considerably at grades 8 and 12 for both subjects, but was not very effective at grade 4 for either subject. To have increased the sample of SD/LEP students further at grade 4 would have required the assessment of additional schools.

Table 3-8

Percentage of Sampled Students Who Were Specified as SD/LEP in the 1996 Main Samples - Mathematics and Science

Subject/	Grade 4		Grade 8		Grade 12	
Sample Type[1]	Unweighted	Weighted	Unweighted	Weighted	Unweighted	Weighted
Mathematics/S1	12.4%	13.2%	9.5%	10.2%	6.4%	6.8%
Mathematics/S2	17.9%	15.7%	19.9%	11.5%	15.3%	8.1%
Mathematics/S3	17.0%	15.4%	18.9%	12.1%	15.7%	8.5%
Total	15.8%	14.7%	16.1%	11.3%	12.7%	7.8%
Science/S2	16.5%	15.8%	13.1%	11.9%	9.5%	9.2%
Science/S3	17.7%	16.7%	18.9%	10.9%	13.6%	7.4%
Total	16.9%	16.2%	15.2%	11.4%	10.9%	8.3%

[1] The numbers in this table reflect the full samples, consisting of schools in the S1, S2, and S3 samples. These sample types are described in Section 3.4.

3.8 EXCLUDED STUDENTS

School staff completed an SD/LEP questionnaire for each sampled student identified as IEP (with an individualized education program) or LEP. Some of these students were deemed unassessable by school authorities and were excluded from the assessment. For the long-term trend samples, a distinct sample of excluded students was identified at each age class. For the main samples, a distinct sample of excluded students was identified for each subject and sample type combination.

The inclusion criteria for the main samples differed somewhat from those used for the long-term trend samples. In addition, the inclusion criteria for the main samples differed by sample type. In sample type 1 schools, the inclusion criteria for the main samples were identical to those used in 1990 and 1992, and were intended to be somewhat more rigorously defined than those used in the long-term trend samples. In sample type 2 schools, new 1996 inclusion criteria were used. In sample type 3 schools, the new 1996 inclusion criteria were used and accommodations were offered to SD/LEP students.

For the long-term trend samples, the inclusion criteria were the same as in past long-term trend assessments, dating back to the early 1980s.

For all samples, students were selected for specific sessions, and the school was then asked to identify those to be excluded. Thus, only age-eligible students were considered for inclusion in the long-term trend tape-administered sessions, whereas both age- and grade-eligible students were considered for inclusion in the print-administered long-term trend samples. The samples of excluded students for the long-term trend samples were weighted in such a way as to account for this procedure appropriately (see Chapter 10).

Table 3-9

Student Exclusion Rates by Age Class and School Type and Sample Type, Weighted

	Age Class 9			Age Class 13			Age Class 17		
Subject/ Sample Type[1]	Public	Non-Public	Total	Public	Non-Public	Total	Public	Non-Public	Total
Main Samples									
Mathematics/S1	5.6%	1.0%	5.2%	4.5%	0.2%	4.1%	3.4%	0.1%	3.0%
Mathematics/S2	9.1%	1.3%	8.1%	4.7%	0.1%	4.3%	3.5%	0.1%	3.2%
Mathematics/S3	4.4%	0.0%	3.9%	3.4%	0.0%	3.1%	3.1%	0.2%	2.8%
Science/S2	9.2%	0.3%	8.2%	4.7%	0.2%	4.3%	4.3%	0.4%	3.9%
Science/S3	6.5%	0.1%	5.9%	3.7%	0.3%	3.4%	2.8%	0.2%	2.6%
Estimation/All	6.7%	0.0%	5.8%	5.1%	0.0%	4.7%	4.0%	0.0%	3.5%
Theme/All	7.6%	0.6%	6.8%	4.4%	0.0%	4.0%	3.6%	1.4%	3.4%
Advanced Mathematics/All	—	—	—	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Advanced Science/All	—	—	—	—	—	—	0.0%	0.0%	0.0%
Long-Term Trend Samples									
Reading/Writing Print	6.6%	0.3%	5.9%	5.9%	0.4%	5.4%	5.3%	0.2%	5.0%
Mathematics/Science Tape	6.3%	0.6%	5.6%	4.8%	0.2%	4.3%	3.5%	0.4%	3.3%

[1] The numbers in this table reflect the full samples, consisting of schools in the S1, S2, and S3 samples. These sample types are described in Section 3.4.

Table 3-9 shows the rates of exclusion for each age class, subject, sample type (for math and science), and school type for the long-term trend and main samples. The most marked effects are the much higher rates of exclusion in public schools than in nonpublic, and the higher rates of exclusion at lower grades. The former phenomenon is no doubt a function of the greater prevalence of special education and language minority programs in public schools. The higher exclusion rates at lower ages, which occurred also in other years, result from the greater proportion of students at these grades who are excluded for reasons of limited English proficiency. In certain areas of the United States, fourth-grade public-school students whose native language is Spanish are taught predominantly in Spanish, and in these schools a very high proportion of sampled students are excluded. Factors that may limit the comparability of these rates to those in previous years are the different inclusion criteria, oversampling of SD/LEP in some subjects, the different subjects assessed, and the inclusion of only grade eligible students in the main samples in 1996.

3.9 STUDENT PARTICIPATION RATES

Table 3-10 summarizes the rates of participation of invited students. The set of invited students consists of the selected students, after removing the excluded students and, in the case of long-term trend samples, removing those students selected for tape-administered sessions who were not age-eligible. For a given session, a makeup session was called for when, for various reasons, more than a predetermined tolerable number of invited students failed to attend the originally scheduled session to which they were invited. The participation rates given in the table express the number finally assessed as a percentage of those initially invited in the participating schools. Participation rates are shown for the main and long-term trend samples and for public and nonpublic schools separately in the case of the main samples. Overall participation rates are also shown for comparable samples from the 1994 NAEP assessment. The table shows that student participation rates in 1996 are similar to those experienced in 1994. The rates increased slightly at age class 9 for both samples, and remained fairly steady for the other samples. At all age classes, the participation rate of nonpublic-school students exceeds that of public-school students, with the difference, both relative and absolute, increasing with age class.

Table 3-10

Student Participation Rates by Age Class and School Type, Unweighted[1]

Samples	1996 Public Number Invited	1996 Public Participation Rate	1996 Nonpublic Number Invited	1996 Nonpublic Participation Rate	1996 Combined Number Invited	1996 Combined Participation Rate[2]	1994 Participation Rate[2]
Age Class 9							
Long-Term Trend	9,715	95.4%	1,204	96.8%	10,919	95.5%	94.2%
Main	24,082	95.1%	5,834	96.6%	29,916	95.4%	93.2%
Age Class 13							
Long-Term Trend	10,980	91.6%	1,152	95.0%	12,132	91.9%	92.2%
Main	28,351	92.3%	6,368	96.7%	34,719	93.1%	91.0%
Age Class 17							
Long-Term Trend	9,051	83.4%	717	91.9%	9,768	84.0%	84.1%
Main	34,199	77.3%	7,473	91.5%	41,672	79.9%	81.1%

[1] The numbers in this table reflect the full samples, including all sample types (see Section 3.4).

[2] Somewhat different inclusion criteria were used for the main samples than for the long-term trend samples in each year, and for the main samples in 1994 versus 1996. The total rates for the main samples are based on a relatively greater contribution from nonpublic-school students. Nonpublic-school students constitute about 18% of the 1996 main samples, 16% of the 1994 main samples, and 11% of the 1994 and 1996 long-term trend samples.

3.10 OVERALL STUDENT PARTICIPATION RATES

The combined impact of school nonparticipation and student absenteeism from sessions within participating schools is summarized in Table 3-11. The table shows the percentages of students assessed, from among those who would have been assessed if all initially selected schools had participated, and if all invited students had attended either an initial or make-up session. The results show that, consistent with earlier rounds of NAEP, the overall level of participation decreases substantially with the increase in age and grade of the students.

So far in this chapter, only unweighted participation rates by age class and school type have been presented. However, analysis is typically performed separately by age class and session type, and NCES standards regarding acceptable potentials for bias are expressed in terms of weighted participation rates. Therefore, Tables 3-12 and 3-13 show weighted participation rates by age class and session type for the main and long-term trend samples, respectively. The main sample rates are for students in the reporting populations. Note that for the main samples, the student participation rates are similar for different session types at grades 4 and 8, but the student participation rates at grade 12 and the school participation rates at all grades vary by session type. The differential school participation rates reflect the fact that, more so than in previous years, different session types include different schools. This is due to the assignment of schools to sample type, the fact that all session types were not assessed in all sample types, and the specific sample types included in the reporting populations for each session type (see Chapter 10). For long-term trend, the participation rates are similar for different session types in the same age class. They are also similar, in general, to the unweighted rates.

The procedures for substituting for nonparticipating schools or imputing for them through weighting and the procedures for imputing for absent students through weighting were designed (so far as feasible) to reduce the biases resulting from school and student nonparticipation. These procedures are discussed in Chapter 10.

Table 3-11

Overall Participation Rates (School and Student Combined) by Age Class, Unweighted[1]

1996 Samples	Age Class 9	Age Class 13	Age Class 17	Overall
Main Samples				
School participation	86.3%	83.3%	79.5%	82.9%
Student participation	95.4%	91.5%	79.9%	88.6%
Overall student participation	82.3%	76.2%	63.5%	73.4%
Number of participating students	28,527	32,328	33,286	94,141
Long-Term Trend Samples				
School participation	85.2%	83.9%	81.4%	83.6%
Student participation	95.5%	91.9%	84.0%	90.8%
Overall student participation	81.4%	77.1%	68.4%	75.9%
Number of participating students	10,432	11,151	8,208	29,791
Overall				
School participation	86.0%	83.5%	79.9%	83.1%
Student participation	95.4%	92.8%	80.7%	89.1%
Overall student participation	82.0%	77.5%	64.5%	74.0%
Number of participating students	38,959	43,479	41,494	123,932

[1] The numbers in this table reflect the full samples, including all sample types (see Section 3.4).

Table 3-12

Weighted Participation Rates by Age Class and Session Type, 1996 Main NAEP Reporting Samples

Participation (Sample Type)	Mathematics Print	Science Print	Mathematics Estimation Print	Mathematics Theme Print	Advanced Mathematics Print	Advanced Science Print
Grade 4						
School participation	82.3%	77.8%	93.5%	77.9%	—	—
Student participation	95.3%	94.9%	96.7%	95.4%	—	—
Overall participation	78.4%	73.8%	90.4%	74.4%	—	—
Grade 8						
School participation	81.5%	79.7%	85.3%	86.8%	77.0%	—
Student participation	92.9%	93.1%	93.8%	92.7%	95.6%	—
Overall participation	75.7%	74.3%	80.0%	80.4%	73.6%	—
Grade 12						
School participation	76.2%	77.4%	63.9%	78.4%	77.6%	77.7%
Student participation	82.3%	77.5%	81.0%	78.2%	85.8%	86.5%
Overall participation	62.7%	60.0%	51.7%	61.3%	66.6%	67.2%

Table 3-13

Weighted Participation Rates by Age Class and Session Type
1996 Long-Term Trend Samples

Participation	Reading/Writing Print	Mathematics/Science Tape
Age Class 9		
School participation	83.5%	82.6%
Student participation	95.6%	95.4%
Overall participation	79.9%	78.8%
Age Class 13		
School participation	82.0%	80.8%
Student participation	92.2%	92.6%
Overall participation	75.6%	74.8%
Age Class 17		
School participation	81.7%	75.6%
Student participation	83.8%	84.1%
Overall participation	68.5%	63.6%

3.11 SAMPLING TEACHERS

The teacher questionnaire was administered to teachers of fourth- and eighth-grade students assessed in mathematics and science and twelfth-grade students assessed in advanced mathematics. Teachers were given the questionnaire if they taught the student the subject in which the student was assessed. The purpose of drawing these samples was not to estimate the attributes of the teacher population, but to estimate the number (proportion) of students whose teachers had various attributes and to correlate student characteristics and performance with the characteristics of their teachers.

The selected teachers were asked to complete a questionnaire concerning themselves and their teaching practices, with specific references to each individual class period containing a student included in the main assessment.

Chapter 4

ASSESSMENT INSTRUMENTS[1]

Stephen Lazer
Educational Testing Service

4.1 INTRODUCTION

In the 1996 assessment, four types of instruments were used to collect data about students, teachers, and schools. Each assessed student received an **assessment booklet** containing both cognitive and background questions. An **SD/LEP Student Questionnaire** was completed by school officials for each sampled student identified as having a disability (SD) or classified as Limited English Proficient (LEP), whether or not the students were able to participate in the assessment. The teachers of fourth-, eighth-, and twelfth-grade students participating in the assessment were asked to complete a **Teacher Questionnaire.** A **School Characteristics and Policies Questionnaire** was distributed to each participating school.

This chapter begins with a discussion of the characteristics of the student booklets used for the 1996 main and long-term trend assessments and how the booklets were assembled. The contents of each booklet and item block is presented in detail in a set of tables. Section 4.4 describes the student, teacher, SD/LEP, and school questionnaires that were part of the 1996 assessment.

4.2 STUDENT BOOKLETS—MAIN ASSESSMENTS

4.2.1 Mathematics

Each student assessed in mathematics received a booklet containing a set of general background questions, content questions, subject-specific background questions, and questions about his or her motivation and familiarity with the assessment materials. The passages and content questions were assembled into sections or blocks. Students in the main assessment were given three 15-minute blocks. Those sampled for the theme assessment completed one 15-minute block and one 30-minute block. Those sampled for the advanced study at grade 8 completed three 20-minute blocks; at grade 12 advanced sample students completed three 30-minute blocks. Students in the estimation sample completed one 15-minute block from the main assessment and two paced-tape sections. The overall assessment time for each student was approximately 63 minutes.

The assembly of blocks into booklets for the main assessment and their subsequent assignment to sampled students was determined by a *balanced incomplete block* (BIB) design with *spiraled* administration. The student booklets contained two five-minute background sections, a one-minute background section, and three 15-minute blocks of items according to a BIB design.

The BIB design for the 1996 national mathematics assessment was *focused* by subject area, so that students received booklets containing only blocks of mathematics questions (not science). The BIB design also balances the order of presentation of the 15-minute blocks of items—every 15-minute block appears as the first cognitive block in two booklets, as the second cognitive block in two other booklets, and as the third cognitive block in another two booklets.

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[1] Stephen Lazer manages assessment development activities for the NAEP program at ETS.

The design used in 1996 required that 13 blocks of mathematics items at each grade be assembled into 26 booklets. Theme blocks were placed in two other booklets, and estimation blocks in one other booklet. At grades 8 and 12, the advanced study was placed in one additional booklet.[2] Once assembled, the main assessment booklets were then *spiraled* and bundled. Spiraling involves interweaving the booklets in a systematic sequence so that each booklet appears an appropriate number of times in the sample. The bundles were designed so that each booklet would appear equally often in each position in a bundle.

The final step in the BIB-spiraling procedure was the assigning of the booklets to the assessed students. The students within an assessment session were assigned booklets in the order in which the booklets were bundled. Thus, most students in an assessment session received different booklets. In the assessment design, representative and randomly equivalent samples of students responded to each item at a given grade level.

Tables 4-1, 4-2, and 4-3 provide the composition and number of booklets administered in the 1996 mathematics assessment. Table 4-4 gives details of the item blocks used in the main assessment, including the number of cognitive items in each block and the booklets in which each block appeared; Table 4-5 gives the same information for blocks in the special components of the assessment. Table 4-6 gives pertinent information about the background sections.

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[2] See Chapter 2 for descriptions of these types of assessment blocks.

Table 4-1

Main Sample Booklet Configuration
Grade 4, Mathematics

Booklet Number	Background		Cognitive Blocks			Motivation Background Block
	Common	Mathematics				
101	C13	M2	M3	M4	M7	MX
102	C13	M2	M4	M5	M8	MX
103	C13	M2	M5	M6	M9	MX
104	C13	M2	M6	M7	M10	MX
105	C13	M2	M7	M8	M11	MX
106	C13	M2	M8	M9	M12	MX
107	C13	M2	M9	M10	M13	MX
108	C13	M2	M10	M11	M14	MX
109	C13	M2	M11	M12	M15	MX
110	C13	M2	M12	M13	M3	MX
111	C13	M2	M13	M14	M4	MX
112	C13	M2	M14	M15	M5	MX
113	C13	M2	M15	M3	M6	MX
114	C13	M2	M3	M5	M10	MX
115[1]	C13	M2	M4	M6	M11	MX
116	C13	M2	M5	M7	M12	MX
117	C13	M2	M6	M8	M13	MX
118	C13	M2	M7	M9	M14	MX
119	C13	M2	M8	M10	M15	MX
120	C13	M2	M9	M11	M3	MX
121[2]	C13	M2	M10	M12	M4	MX
122	C13	M2	M11	M13	M5	MX
123	C13	M2	M12	M14	M6	MX
124	C13	M2	M13	M15	M7	MX
125	C13	M2	M14	M3	M8	MX
126	C13	M2	M15	M4	M9	MX
127[3]	C13	M2	M4	M16	M17	MX
128[4]	C13	M2	M4	M21	—	MX
129[4]	C13	M2	M4	M22	—	MX
921[5]	C13	M2	M10	M12	M4	MX

[1] This booklet was a large print version.

[2] This booklet was also used for SD/LEP students who took a regular-print version.

[3] This was an estimation booklet (involved paced audiotapes).

[4] This was a theme booklet.

[5] This was a bilingual booklet presented to some SD/LEP students. It contained the same blocks as Booklet Number 121.

Table 4-2

Main Sample Booklet Configuration
Grade 8, Mathematics

Booklet Number	Background		Cognitive Blocks			Motivation Background Block
	Common	Mathematics				
101	C13	M2	M3	M4	M7	MX
102	C13	M2	M4	M5	M8	MX
103	C13	M2	M5	M6	M9	MX
104	C13	M2	M6	M7	M10	MX
105	C13	M2	M7	M8	M11	MX
106	C13	M2	M8	M9	M12	MX
107	C13	M2	M9	M10	M13	MX
108	C13	M2	M10	M11	M14	MX
109	C13	M2	M11	M12	M15	MX
110	C13	M2	M12	M13	M3	MX
111	C13	M2	M13	M14	M4	MX
112	C13	M2	M14	M15	M5	MX
113	C13	M2	M15	M3	M6	MX
114	C13	M2	M3	M5	M10	MX
115[1]	C13	M2	M4	M6	M11	MX
116	C13	M2	M5	M7	M12	MX
117	C13	M2	M6	M8	M13	MX
118	C13	M2	M7	M9	M14	MX
119	C13	M2	M8	M10	M15	MX
120	C13	M2	M9	M11	M3	MX
121[2]	C13	M2	M10	M12	M4	MX
122	C13	M2	M11	M13	M5	MX
123	C13	M2	M12	M14	M6	MX
124	C13	M2	M13	M15	M7	MX
125	C13	M2	M14	M3	M8	MX
126	C13	M2	M15	M4	M9	MX
127[3]	C13	M2	M4	M16	M17	MX
128[4]	C13	M2	M4	M21	—	MX
129[4]	C13	M2	M4	M22	—	MX
130[5]	C13	M2	M20	M18	M19	MX
921[5/6]	C13	M2	M10	M12	M4	MX

[1] This booklet was a large print version.

[2] This booklet was also used for SD/LEP students who took a regular-print version.

[3] This was an estimation booklet (involved paced audiotapes).

[4] This was a theme booklet.

[5] This was an advanced booklet.

[6] This was a bilingual booklet presented to some SD/LEP students. It contained the same blocks as Booklet Number 121.

Table 4-3

Main Sample Booklet Configuration
Grade 12, Mathematics

Booklet Number	Background		Cognitive Blocks			Motivation Background Block
	Common	Mathematics				
101	C13	M2	M3	M4	M7	MX
102	C13	M2	M4	M5	M8	MX
103	C13	M2	M5	M6	M9	MX
104	C13	M2	M6	M7	M10	MX
105	C13	M2	M7	M8	M11	MX
106	C13	M2	M8	M9	M12	MX
107	C13	M2	M9	M10	M13	MX
108	C13	M2	M10	M11	M14	MX
109	C13	M2	M11	M12	M15	MX
110	C13	M2	M12	M13	M3	MX
111	C13	M2	M13	M14	M4	MX
112	C13	M2	M14	M15	M5	MX
113	C13	M2	M15	M3	M6	MX
114	C13	M2	M3	M5	M10	MX
115[1]	C13	M2	M4	M6	M11	MX
116	C13	M2	M5	M7	M12	MX
117	C13	M2	M6	M8	M13	MX
118	C13	M2	M7	M9	M14	MX
119	C13	M2	M8	M10	M15	MX
120	C13	M2	M9	M11	M3	MX
121[2]	C13	M2	M10	M12	M4	MX
122	C13	M2	M11	M13	M5	MX
123	C13	M2	M12	M14	M6	MX
124	C13	M2	M13	M15	M7	MX
125	C13	M2	M14	M3	M8	MX
126	C13	M2	M15	M4	M9	MX
127[3]	C13	M2	M4	M16	M17	MX
128[4]	C13	M2	M4	M21	—	MX
129[4]	C13	M2	M4	M22	—	MX
130[5]	C13	M2	M20	M18	M19	MX

[1] This booklet was a large print version.

[2] This booklet was used for SD/LEP students who took a regular-print version.

[3] This was an estimation booklet (involved paced audiotapes).

[4] This was a theme booklet.

[5] This was an advanced booklet.

Table 4-4

1996 Mathematics Assessment, Main BIB

Block	Designation	Grade	Multiple-Choice	Short Constructed-Response	Extended Constructed-Response	Total	Comments
3	S1M3	4	9	4	0	13	Trend (92)
	S2M3	8	9	3	1	13	Trend (92)
	S3M3	12	10	4	0	14	Trend (92)
4	S123M4a	4	14	0	0	14	Trend (90)
	S123M4b	8	21	0	0	21	Trend (90)
	S123M4c	12	22	0	0	22	Trend (90)
5	S12M5a	4	4	5	1	10	New
	S12M5b	8	6	4	1	11	New
	S3M5	12	4	5	1	10	New -- Calc
6	S123M6a	4	0	11	0	11	Trend (90)
	S123M6b	8	0	16	0	16	Trend (90)
	S123M6c	12	0	17	0	17	Trend (90)
7	S12M7a	4	3	4	1	8	New -- Manip
	S12M7b	8	5	4	1	10	New -- Manip
	S3M7	12	4	5	1	10	New -- Manip
8	S123M8a	4	14	1	0	15	Trend Calc (90)
	S123M8b	8	16	2	0	18	Trend Calc (90)
	S123M8c	12	17	4	0	21	Trend Calc (90)
9	S1M9	4	9	2	1	12	Trend (92)
	S23M9b	8	5	3	1	9	Trend (92)
	S23M9c	12	6	2	1	9	Trend (92)
10	S123M10a	4	0	6	0	6	Manipulatives (92)
	S123M10b	8	0	7	0	7	Manipulatives (92)
	S123M10c	12	3	6	1	10	Manipulatives (92)
11	S12M11a	4	11	5	0	16	Trend (92)
	S12M11b	8	13	6	0	19	Trend (92)
	S3M11	12	11	3	0	14	Trend (92)
12	S1M12	4	5	3	1	9	New Calculator
	S23M12b	8	4	4	1	9	New Calculator
	S23M12c	12	4	5	1	10	New Calculator
13	S1M13	4	6	5	1	12	Trend (92)
	S2M13	8	6	4	1	11	Trend (92)
	S3M13	12	3	5	1	9	Trend Prot (92)
14	S1M14	4	4	5	1	10	New Calculator
	S23M14b	8	5	3	1	9	New Calculator
	S23M14c	12	5	3	1	9	New Calculator
15	S1M15	4	3	6	1	10	New -- Ruler
	S2M15	8	4	4	1	9	New -- Calculator/Protractor
	S3M15	12	4	5	1	10	New -- Calculator

Table 4-5

1996 Mathematics Assessment, Estimation and Targeted Assessment

Block	Designation	Grade	Multiple-Choice	Short Constructed-Response	Extended Constructed-Response	Total	Comments
16	S123M16a	4	20	0	0	20	Trend Estimation (90)
	S123M16b	8	22	0	0	22	Trend Estimation (90)
	S123M16c	12	22	0	0	22	Trend Estimation (90)
17	S1M17	4	10	3	0	13	New Estimation
	S2M17	8	9	6	0	15	New Estimation
	S3M17	12	16	0	0	16	New Estimation
18	S2M18	8	3	6	1	10	New Algebra
	S3M18	12	3	6	2	11	New Advanced Mathematics
19	S2M19	8	6	5	1	12	New Algebra
	S3M19	12	4	5	2	11	New Advanced Mathematics
21[1]	S1M21	4	1	4	3	8	New Theme
	S23M21b	8	4	5	2	11	New Theme
	S23M21c	12	4	5	2	11	New Theme
22	S1M22	4	0	3	3	6	New Theme
	S2M22	8	4	4	2	10	New Theme
	S2M23	12	4	2	1	7	New Theme

[1] Block 20 was a block composed of exercises from the main assessment used for linking.

Table 4-6

Background Sections of Student Mathematics Booklets

	Number of Questions	Placement in Student Booklet
Grade 4		
General Background	24	Section 1
Mathematics Background	25	Section 2
Motivation	5	Section 6[1]
Grade 8		
General Background	26	Section 1
Mathematics Background	31	Section 2
Motivation	5	Section 6[1]
Grade 12		
General Background	35	Section 1
Mathematics Background	44	Section 2
Motivation	5	Section 6[1]

[1] Or Section 5 in theme booklets.

4.2.2 Science

Each student assessed in science received a booklet containing general background questions, content questions, subject-specific background questions, and questions about his or her motivation and familiarity with the assessment materials. The passages and content questions were assembled into sections or blocks. Students in the main assessment were given three 20-minute blocks at grade 4, and three 30-minute blocks at grades 8 and 12. The last block in every book was a hands-on block. Those sampled for the advanced study at grade 12 completed four 30-minute blocks. The overall assessment time for each student was, on average, 120 minutes.

The assembly of blocks into booklets for the main assessment and their subsequent assignment to sampled students was determined by a complex design with *spiraled* administration. The student booklets contained two five-minute background sections, a one-minute background section, and three blocks of items.

The design for the 1996 national assessment was *focused* by subject area, so that students received booklets containing only blocks of science questions (not mathematics). The design also balances the order of presentation of the blocks of items, except for the hands-on blocks, which always appear in position three of a booklet. All other blocks appear an equal number of times in position one and position two. Further, the design was set up to ensure that no student answered more than one theme-based block (though some students did not receive any). This design allows for some balancing of the impact of context and fatigue effects to be measured and reported, but makes allowance for the difficulties and disruption of administering hands-on blocks. It also takes into account the limited breadth of content coverage included in the theme blocks.

The design used in 1996 required that 15 blocks of science items at each grade be assembled into 37 booklets. At grade 12, the advanced study was composed of three additional booklets. Once assembled, the main assessment booklets were then *spiraled* and bundled. Spiraling involves interweaving the booklets in a systematic sequence so that each booklet appears an appropriate number of times in the sample. The bundles were designed so that each booklet would appear equally often in each position in a bundle.

The final step in the spiraling procedure was the assigning of the booklets to the assessed students. The students within an assessment session were assigned booklets in the order in which the booklets were bundled. Thus, most students in an assessment session received different booklets. In the assessment design, representative and randomly equivalent samples of about 1,200 students responded to each item at a given grade level.

Tables 4-7, 4-8, and 4-9 provide the composition and number of booklets administered in the main 1996 science assessment. Table 4-10 provides the composition of booklets in the advanced science study. Table 4-11 gives details of the item blocks used in the main assessment, including the number of cognitive items in each block and the booklets in which each block appeared; Table 4-12 gives the same information for blocks in the special components of the assessment. Table 4-13 gives pertinent information about the background sections.

Table 4-7

Main Sample Booklet Configuration
Grade 4, Science

Booklet Number	Cognitive Blocks		Hands-On Task[1]	Background		Motivation Background Block
				Common	Science	
201	S7	S10	S3	C19	S2	SX
202	S7	S11	S4	C19	S2	SX
203	S7	S12	S5	C19	S2	SX
204	S7	S13	S6	C19	S2	SX
205	S10	S11	S3	C19	S2	SX
206	S12	S8	S4	C19	S2	SX
207	S10	S13	S5	C19	S2	SX
208	S10	S8	S6	C19	S2	SX
209	S11	S12	S3	C19	S2	SX
210	S13	S14	S4	C19	S2	SX
211	S11	S8	S5	C19	S2	SX
212	S11	S14	S6	C19	S2	SX
213	S13	S8	S3	C19	S2	SX
214	S8	S15	S4	C19	S2	SX
215	S12	S14	S5	C19	S2	SX
216	S12	S15	S6	C19	S2	SX
217	S8	S14	S3	C19	S2	SX
218	S14	S20	S4	C19	S2	SX
219	S8	S20	S5	C19	S2	SX
220[2]	S13	S20	S6	C19	S2	SX
221	S14	S15	S3	C19	S2	SX
222	S15	S21	S4	C19	S2	SX
223	S15	S9	S5	C19	S2	SX
224	S8	S21	S6	C19	S2	SX
225	S20	S21	S3	C19	S2	SX
226	S20	S9	S4	C19	S2	SX
227	S20	S7	S5	C19	S2	SX
228	S14	S9	S6	C19	S2	SX
229	S21	S9	S3	C19	S2	SX
230	S21	S7	S4	C19	S2	SX
231	S21	S10	S5	C19	S2	SX
232	S15	S7	S6	C19	S2	SX
233	S9	S13	S3	C19	S2	SX
234	S9	S10	S4	C19	S2	SX
235	S9	S11	S5	C19	S2	SX
236	S9	S12	S6	C19	S2	SX
237	S14	S7	S3	C19	S2	SX

[1] Hands-on task blocks: Block S3 uses "A" kit - seeds; Block S4 uses "B" kit - unknown powders; Block S5 uses "C" kit - floating pencil; and Block S6 uses "D" kit - markers.

[2] This booklet was also used for SD/LEP students who took a regular-print version.

Table 4-8

Main Sample Booklet Configuration
Grade 8, Science

Booklet Number	Cognitive Blocks		Hands-On Task[1]	Background Common	Background Science	Motivation Background Block
201	S7	S10	S3	C19	S2	SX
202	S7	S11	S4	C19	S2	SX
203	S7	S12	S5	C19	S2	SX
204	S7	S13	S6	C19	S2	SX
205	S10	S11	S3	C19	S2	SX
206	S12	S8	S4	C19	S2	SX
207	S10	S13	S5	C19	S2	SX
208	S10	S8	S6	C19	S2	SX
209	S11	S12	S3	C19	S2	SX
210	S13	S14	S4	C19	S2	SX
211	S11	S8	S5	C19	S2	SX
212	S11	S14	S6	C19	S2	SX
213	S13	S8	S3	C19	S2	SX
214	S8	S15	S4	C19	S2	SX
215	S12	S14	S5	C19	S2	SX
216	S12	S15	S6	C19	S2	SX
217	S8	S14	S3	C19	S2	SX
218	S14	S20	S4	C19	S2	SX
219	S8	S20	S5	C19	S2	SX
220[2]	S13	S20	S6	C19	S2	SX
221	S14	S15	S3	C19	S2	SX
222	S15	S21	S4	C19	S2	SX
223	S15	S9	S5	C19	S2	SX
224	S8	S21	S6	C19	S2	SX
225	S20	S21	S3	C19	S2	SX
226	S20	S9	S4	C19	S2	SX
227	S20	S7	S5	C19	S2	SX
228	S14	S9	S6	C19	S2	SX
229	S21	S9	S3	C19	S2	SX
230	S21	S7	S4	C19	S2	SX
231	S21	S10	S5	C19	S2	SX
232	S15	S7	S6	C19	S2	SX
233	S9	S13	S3	C19	S2	SX
234	S9	S10	S4	C19	S2	SX
235	S9	S11	S5	C19	S2	SX
236	S9	S12	S6	C19	S2	SX
237	S14	S7	S3	C19	S2	SX

[1] Hands-On task blocks: Block S6 uses "D" kit - markers; Block S3 uses "E" kit - powders; Block S4 uses "F" kit - salt solutions; and Block S5 uses "G" kit - soil tests.

[2] This booklet was also used for SD/LEP students who took a regular-print version.

Table 4-9

Main Sample Booklet Configuration
Grade 12, Science

Booklet Number	Cognitive Blocks		Hands-On Task[1]	Background		Motivation Background Block
				Common	Science	
201	S7	S10	S3	C19	S2	SX
202	S7	S11	S4	C19	S2	SX
203	S7	S12	S5	C19	S2	SX
204	S7	S13	S6	C19	S2	SX
205	S10	S11	S3	C19	S2	SX
206	S12	S8	S4	C19	S2	SX
207	S10	S13	S5	C19	S2	SX
208	S10	S8	S6	C19	S2	SX
209	S11	S12	S3	C19	S2	SX
210[2]	S13	S14	S4	C19	S2	SX
211	S11	S8	S5	C19	S2	SX
212	S11	S14	S6	C19	S2	SX
213	S13	S8	S3	C19	S2	SX
214	S8	S15	S4	C19	S2	SX
215	S12	S14	S5	C19	S2	SX
216	S12	S15	S6	C19	S2	SX
217	S8	S14	S3	C19	S2	SX
218	S14	S20	S4	C19	S2	SX
219	S8	S20	S5	C19	S2	SX
220	S13	S20	S6	C19	S2	SX
221	S14	S15	S3	C19	S2	SX
222	S15	S21	S4	C19	S2	SX
223	S15	S9	S5	C19	S2	SX
224	S8	S21	S6	C19	S2	SX
225	S20	S21	S3	C19	S2	SX
226	S20	S9	S4	C19	S2	SX
227	S20	S7	S5	C19	S2	SX
228	S14	S9	S6	C19	S2	SX
229	S21	S9	S3	C19	S2	SX
230	S21	S7	S4	C19	S2	SX
231	S21	S10	S5	C19	S2	SX
232	S15	S7	S6	C19	S2	SX
233	S9	S13	S3	C19	S2	SX
234	S9	S10	S4	C19	S2	SX
235	S9	S11	S5	C19	S2	SX
236	S9	S12	S6	C19	S2	SX
237	S14	S7	S3	C19	S2	SX

[1] Hands-On task blocks: Block S5 uses "G" kit - soil tests; Block S3 uses "H" kit - antacid; Block S4 uses "I" kit - separation; and Block S6 uses "J" kit - pendulum.

[2] This booklet was also used for SD/LEP students who took a regular-print version.

Table 4-10

Main Sample Booklet Configuration
Grade 12, Advanced Science

Booklet Number	Cognitive Blocks			Hands-On Task	Background		Motivation Background Block
					Common	Science	
238	S19	S18	S17	S16	C19	S2	SX
239	S19	S17	S16	S18	C19	S2	SX
240	S19	S16	S18	S17	C19	S2	SX

Table 4-11

1996 Science Assessment, Main BIB

Block	Designation	Grade	Multiple-Choice	Short Constructed-Response	Extended Constructed-Response	Total	Comments
3	S1S3	4	0	7	0	7	Hands-on
	S2S3	8	0	4	2	6	Hands-on
	S3S3	12	0	4	2	6	Hands-on
4	S1S4	4	1	0	7	7	Hands-on
	S2S4	8	3	4	3	10	Hands-on
	S3S4	12	0	1	3	4	Hands-on
5	S1S5	4	0	5	6	11	Hands-on
	S23S5	8/12	0	6	0	6	Hands-on
6	S12S6A	4	0	0	4	4	Hands-on
	S12S6B	8	0	5	2	7	Hands-on
	S3S6	12	0	6	2	8	Hands-on
7	S1S7	4	0	10	0	10	Theme-based
	S2S7	8	4	10	0	14	Theme-based
	S3S7	12	5	7	3	15	Theme-based
8	S1S8	4	1	6	1	8	Theme-based
	S23S8A	8	5	5	0	10	Theme-based
	S23S8B	12	6	7	1	14	Theme-based
9	S12S9A	4	2	6	1	9	Theme-based
	S12S9B	8	3	9	1	13	Theme-based
	S3S9	12	4	8	2	14	Theme-based
10	S1S10	4	6	4	1	11	Concept/Problem-Solving
	S2S10	8	8	7	1	16	Concept/Problem-Solving
	S3S10	12	7	7	1	15	Concept/Problem-Solving
11	S1S11	4	6	5	0	11	Concept/Problem-Solving
	S2S11	8	8	7	1	16	Concept/Problem-Solving
	S3S11	12	7	5	3	15	Concept/Problem-Solving
12	S1S12	4	6	4	1	10	Concept/Problem-Solving
	S23S12	8/12	8	6	2	16	Concept/Problem-Solving
13	S1S13	4	6	4	1	11	Concept/Problem-Solving
	S23S13	8/12	8	7	1	16	Concept/Problem-Solving
14	S12S14A	4	5	5	0	10	Concept/Problem-Solving
	S12S14B	8	7	11	0	18	Concept/Problem-Solving
	S3S14	12	8	6	2	16	Concept/Problem-Solving
15	S12S15A	4	3	5	1	9	Concept/Problem-Solving
	S12S15B	8	7	7	2	16	Concept/Problem-Solving
	S3S15	12	0	5	2	7	In-depth
20	S1S20	4	6	2	3	11	Concept/Problem-Solving
	S2S20	8	8	6	2	16	Concept/Problem-Solving
	S3S20	12	7	6	3	16	Concept/Problem-Solving
21	S1S21	4	5	3	2	10	Concept/Problem-Solving
	S2S21	8	7	7	2	16	Concept/Problem-Solving
	S3S21	12	8	4	4	16	Concept/Problem-Solving

Table 4-12

1996 Science Assessment, Advanced Assessment

Block	Designation	Grade	Multiple-Choice	Short Constructed-Response	Extended Constructed-Response	Total	Comments
16	S3S16	12	7	8	1	16	Advanced Block
17	S3S17	12	7	5	4	16	Advanced Block
18	S3S18	12	7	4	5	16	Advanced Block
19	S3S19	12	9	7	2	18	Advanced Block

Table 4-13

Background Sections of 1996 Student Science Booklets

	Number of Questions	Placement in Student Booklet
Grade 4		
General Background	24	Section 4
Science Background	39	Section 5
Motivation	5	Section 6
Grade 8		
General Background	26	Section 4
Science Background	42	Section 5
Motivation	5	Section 6
Grade 12		
General Background	36	Section 4
Science Background	53	Section 5
Motivation	5	Section 6

4.3 STUDENT BOOKLETS—LONG-TERM TREND ASSESSMENTS

There were several long-term trend samples in the 1994 assessment (see Chapter 1), each of which required the use of special booklets. Tables 4-14, 4-15, and 4-16 summarize the contents of each trend assessment booklet and show how many of each booklet were administered. Tables 4-20, 4-21, and 4-22 give details of the item blocks used in the long-term trend assessments, including the number of cognitive and constructed-response items in each block and the booklets in which each block appeared.

Reading and Writing Long-Term Trend. Six booklets (numbered 51 to 56) containing reading and writing items were administered to each age class. These booklets were identical to booklets used in previous assessments of reading and writing and were spiraled for administration. Each booklet consisted of a common background block (BZ) and three cognitive blocks (at least one reading block and at least one writing block). In addition to cognitive items, the cognitive blocks also contained subject-related background questions.

Mathematics and Science Long-Term Trend. Three booklets (91, 92, and 93) at ages 9 and 13 and two booklets (84 and 85) at age 17, containing mathematics and science items, were identical to those used in previous assessments to measure trends. Each booklet contained a common background block (C1 or BZ) and three cognitive blocks. At ages 9 and 13, these booklets contained one reading block (R1, R2, or R3), one mathematics block (M1, M2, or M3) and one science block (S1, S2, or S3). At age 17, each booklet contained at least one mathematics block (M1 to M3) and at least one science block (S1 - S3). Mathematics block M3 contained items that required the use of a calculator. All cognitive blocks also contained subject-related background questions.

Table 4-14

Long-Term Trend Sample Booklet Contents and Number of Booklets Administered

Age Class 9

Subject Area	Booklet Number	Common Background Block	Subject Area Background Block[1]	Cognitive Blocks			Number of Booklets Administered
Reading and Writing	51	BZ	—	BC	BL	BQ	1,186
	52	BZ	—	BH	BE	BR	1,165
	53	BZ	—	BC	BK	BJ	1,178
	54	BZ	—	BG	BO	BE	1,180
	55	BZ	—	BM	BG	BN	1,169
	56	BZ	—	BV	BR		1,184
Mathematics and Science	91	C1	—	R1	M1	S1	2,388
	92	C1	—	S2	R2	M3[2]	2,512
	93	C1	—	M2	S3	R3	2,435

[1] Subject area background questions are included in cognitive blocks for this booklet.

[2] Calculator needed for this block.

Table 4-15

Long-Term Trend Sample Booklet Contents and Number of Booklets Administered
Age Class 13

Subject Area	Booklet Number	Common Background Block	Subject Area Background Block[1]	Cognitive Blocks			Number of Booklets Administered
Reading and Writing	51	BZ	—	BM	BK	BD	919
	52	BZ	—	BC	BL	BQ	906
	53	BZ	—	BH	BE	BR	923
	54	BZ	—	BN	BC	BD	905
	55	BZ	—	BG	BO	BE	928
	56	BZ	—	BG	BJ	BP	933
Mathematics and Science	91	C1	—	R1	M1	S1	1,928
	92	C1	—	S2	R2	M3[2]	1,976
	93	C1	—	M2	S3	R3	2,005

[1] Subject area background questions are included in cognitive blocks for this booklet.
[2] Calculator needed for this block.

Table 4-16

Long-Term Trend Sample Booklet Contents and Number of Booklets Administered
Age Class 17

Subject Area	Booklet Number	Common Background Block	Subject Area Background Block[1]	Cognitive Blocks			Number of Booklets Administered
Reading and Writing	51	BZ	—	BM	BK	BD	927
	52	BZ	—	BC	BL	BQ	924
	53	BZ	—	BH	BE	BR	917
	54	BZ	—	BN	BC	BD	951
	55	BZ	—	BG	BO	BE	939
	56	BZ	—	BG	BJ	BP	911
Mathematics and Science	84	C1	—	M1	M2	S3	2,207
	85	C1	—	S1	S2	M3[2]	2,152

[1] Subject area background questions are included in cognitive blocks for this booklet.
[2] Calculator needed for this block.

Table 4-17

Long-Term Trend Sample Block Information, Age Class 9

Block	Type	Total Number of Items	Number of Cognitive Items	Number of Open-Ended Items		Booklets Containing Block
				Cognitive	Noncognitive	
BZ	Common Background	37	0	0	1	51 - 56
C1	Common Background	28	0	0	0	91 - 93
BC	Writing Background/Cognitive	23	1	1	0	51, 53
BE	Writing Background/Cognitive	11	2	2	0	52, 54
BG	Writing Background/Cognitive	8	2	2	0	54, 55
BH	Reading Background/Cognitive	15	11	1	0	52
BJ	Reading Background/Cognitive	24	13	1	0	53
BK	Reading Background/Cognitive	19	11	0	0	53
BL	Reading Background/Cognitive	26	7	1	1	51
BM	Reading Background/Cognitive	16	12	1	0	55
BN	Reading Background/Cognitive	25	14	1	0	55
BO	Reading Background/Cognitive	22	11	0	0	54
BQ	Reading Background/Cognitive	21	12	0	0	51
BR	Reading Background/Cognitive	16	12	0	0	52, 56
BV	Reading and Writing Background/Cognitive	36	7 Rd. 1 Wr.	1 Rd. 1 Wr.	0	56
R1	Reading Background/Cognitive	20	9	0	0	91
R2	Reading Background/Cognitive	20	11	0	0	92
R3	Reading Background/Cognitive	17	10	1	0	93
M1	Mathematics Background/Cognitive	26	26	9	0	91
M2	Mathematics Background/Cognitive	26	26	9	0	93
M3	Mathematics Background/Cognitive (Calc.)	19	16	10	0	92
S1	Science Background/Cognitive	23	18	0	0	91
S2	Science Background/Cognitive	25	25	0	0	92
S3	Science Background/Cognitive	31	20	0	0	93

Table 4-18

Long-Term Trend Sample Block Information, Age Class 13

Block	Type	Total Number of Items	Number of Cognitive Items	Number of Open-Ended Items		Booklets Containing Block
				Cognitive	Noncognitive	
BZ	Common Background	37	0	0	1	51 - 56
C1	Common Background	30	0	0	0	91 - 93
BC	Writing Background/Cognitive	23	1	1	0	52, 54
BD	Writing Background/Cognitive	25	1	1	0	51, 54
BE	Writing Background/Cognitive	11	2	2	0	53, 55
BG	Writing Background/Cognitive	8	2	2	0	55, 56
BH	Reading Background/Cognitive	18	13	1	1	53
BJ	Reading Background/Cognitive	24	14	2	0	56
BK	Reading Background/Cognitive	17	9	1	0	51
BL	Reading Background/Cognitive	27	6	1	1	52
BM	Reading Background/Cognitive	16	12	1	0	51
BN	Reading Background/Cognitive	23	12	1	0	54
BO	Reading Background/Cognitive	21	10	2	0	55
BP	Reading Background/Cognitive	15	9	1	0	55
BQ	Reading Background/Cognitive	23	17	0	0	52
BR	Reading Background/Cognitive	19	15	0	0	53
R1	Reading Background/Cognitive	31	12	1	0	91
R2	Reading Background/Cognitive	19	10	0	0	92
R3	Reading Background/Cognitive	28	13	0	0	93
M1	Mathematics	51	37	9	0	91
M2	Background/Cognitive	44	37	8	0	93
M3	Mathematics Background/Cognitive Mathematics Background/Cognitive (Calc.)	32	24	10	0	92
S1	Science Background/Cognitive	36	25	0	0	91
S2	Science Background/Cognitive	40	27	0	0	92
S3	Science Background/Cognitive	36	27	0	0	93

Table 4-19

Long-Term Trend Sample Block Information, Age Class 17

Block	Type	Total Number of Items	Number of Cognitive Items	Number of Open-Ended Items		Booklets Containing Block
				Cognitive	Noncognitive	
BZ	Common Background	48	0	0	1	51 - 56
C1	Common Background	48	0	0	0	84, 85
BC	Writing Background/Cognitive	23	1	1	0	52, 54
BD	Writing Background/Cognitive	25	1	1	0	51, 54
BE	Writing Background/Cognitive	11	2	2	0	53, 55
BG	Writing Background/Cognitive	8	2	2	0	55, 56
BH	Reading Background/Cognitive	19	13	1	2	53
BJ	Reading Background/Cognitive	17	6	2	1	56
BK	Reading Background/Cognitive	17	9	1	0	51
BL	Reading Background/Cognitive	32	6	1	2	52
BM	Reading Background/Cognitive	16	12	1	0	51
BN	Reading Background/Cognitive	32	12	1	1	54
BO	Reading Background/Cognitive	24	13	1	0	55
BP	Reading Background/Cognitive	25	11	1	0	56
BQ	Reading Background/Cognitive	17	11	1	0	52
BR	Reading Background/Cognitive	20	9	0	0	53
M1	Mathematics Background/Cognitive	49	35	10	0	84
M2	Mathematics Background/Cognitive	49	35	5	0	84
M3	Mathematics Background/Cognitive (Calculator)	35	24	14	0	85
S1	Science Background/Cognitive	38	27	0	0	85
S2	Science Background/Cognitive	41	32	0	0	85
S3	Science Background/Cognitive	32	23	0	0	84

4.4 STUDENT, TEACHER, AND SCHOOL QUESTIONNAIRES

4.4.1 Student Questionnaires

Each booklet in the main assessment included three student background questionnaires. The first, consisting of general background questions, included questions about race/ethnicity, mother's and father's level of education, reading materials in the home, homework, attendance, academic expectations, and which parents lived at home. The second, consisting of subject-area background questions, included questions about instructional activities, courses taken, use of specialized resources such as calculators in mathematics class, and views on the utility and value of the subject matter. Students were given five minutes to complete each of these questionnaires, with the exception of the fourth graders, who were given more time because the items in the general questionnaire were read aloud for them. The third questionnaire followed the three cognitive blocks and contained five questions about students' motivation to do well on the assessment, their perceptions concerning the difficulty of the assessment, and their familiarity with types of questions included.

The student questionnaires are described in detail in Chapter 2.

4.4.2 Teacher Questionnaires

To supplement the information on instruction reported by students, the mathematics teachers of the students participating in the mathematics assessment were asked to complete a questionnaire about their instructional practices, teaching backgrounds, and characteristics. The teacher questionnaire contained two parts. The first part pertained to the teachers' background and general training. The second part pertained to specific training in teaching mathematics and the procedures the teacher uses for *each class* containing an assessed student, as well as collecting information on teachers' awareness and knowledge of the NCTM *Standards*.

The **Teacher Questionnaire, Part I: Background and General Training** included questions pertaining to gender, race/ethnicity, years of teaching experience, certification, degrees, major and minor fields of study, course work in education, course work in specific subject areas, amount of in-service training, extent of control over instructional issues, and availability of resources for their classroom.

The **Teacher Questionnaire, Part II: Training in Mathematics and Classroom Instructional Information** included questions on the teacher's exposure to various issues related to mathematics and teaching mathematics through pre- and in-service training, ability level of students in the class, whether students were assigned to the class by ability level, time on task, homework assignments, frequency of instructional activities used in class, methods of assessing student progress in mathematics, instructional emphasis given to the mathematics abilities covered in the assessment, and use of particular resources.

Because the sampling for the teacher questionnaires was based on participating students, the responses to a particular teacher questionnaire do not necessarily represent all teachers of that subject area at that grade level in the nation. Rather, they are teachers of the representative sample of students assessed. It is important to note that in all NAEP reports, the student is always the unit of analysis, even when information from the teacher or school questionnaire is being reported. Using the student as the unit of analysis makes it possible to describe the instruction received by representative samples of students. Although this approach may provide a different perspective from other studies simply reporting information about teachers or schools, it is consistent with NAEP's goal of providing information about the educational context and performance of students.

The teacher questionnaires are described in detail in Chapter 2.

4.4.3 School Questionnaires

A **School Characteristics and Policies Questionnaire** was given to the principal or other administrator of each school that participated in the assessment. This information provided an even broader picture of the instructional context for students' mathematics achievement. This questionnaire included questions about background and characteristics of school principals, length of school day and year, school enrollment, absenteeism, dropout rates, size and composition of teaching staff, policies about grouping students, curriculum, testing practices and uses, special priorities and school-wide programs, availability of resources, special services, community services, policies for parental involvement, and school-wide problems.

School Characteristics and Policies questionnaires are described in detail in Chapter 2.

4.4.4 SD/LEP Student Questionnaires

The SD/LEP Student Questionnaire was completed by the teachers of those students who were selected to participate in the assessment sample who were classified as Students with Disabilities (SD) or were classified as Limited English Proficient (LEP). The questionnaire was completed for all SD or LEP students, whether or not they actually participated in the assessment. This questionnaire asked about the nature of the student's disability and the special programs in which the student participated.

Schools were permitted to exclude certain students from the assessment. The same exclusion criteria and rules used in the national assessment were also applied to the Trial State Assessment. Although the intent was to assess all sampled students, students who were identified by school staff as not capable of participating meaningfully were excluded. The NAEP guidelines for exclusion were intended to assure uniformity of exclusion criteria from school to school as well as from state to state.

More information about the SD/LEP questionnaire and exclusion criteria are provided in Chapters 2 and 5.

Chapter 5

FIELD OPERATIONS AND DATA COLLECTION[1]

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5.1 INTRODUCTION

This chapter describes the field operations and data collection activities for the national assessment component of the 1996 National Assessment of Educational Progress (NAEP). The national assessment is comprised of main samples and long-term trend samples. Main NAEP samples typically involve new assessment items, and may include new subject areas and innovative features; in long-term trend, the procedures and items from previous years are carried forward so that trends in student achievement can be measured over time. Both the main and long-term trend assessments are based on probability samples of schools and students that allow for regional and national reporting only. The State Assessment, the second major component of NAEP, comprises the state program that uses main assessment materials and involves much larger sample sizes per state (or jurisdiction), so that results can be reported for each participating state (for further technical information on the State Assessment, see the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics*, Allen, Jenkins, Kulick, and Zelenak, 1997, and the *Technical Report of the NAEP 1996 State Assessment Program in Science*, Allen, Swinton, Isham, and Zelenak, 1997).

The design of the national assessment component of NAEP is described in the remaining sections of this chapter. For all components, NAEP guarantees the anonymity of participants, and student or teacher names are never recorded on assessment booklets nor removed from the schools. NAEP results are reported on the national level and by region of the country, not by school district, school, or individual student. Only group statistics are reported, broken down by gender, race/ethnicity, and a host of variables that illuminate teachers' instructional practices.

5.1.1 Field Organization

The 1996 main assessment involved some new items and components including many innovative features. For example, the science assessment differed from previous NAEP science assessments in that every student performed an experiment. The mathematics assessment involved the use of mathematical tools and a larger number of constructed-response items than in the past. Much of the mathematics assessment has been used since 1990, thus providing "short-term trend" data. All students in a particular assessment session received a booklet in the same subject (i.e., mathematics or science). Even though many different booklets were used in a particular session, they were all for the same subject.

In most schools sampled for the main assessment, more than one session type was conducted. In about one-third of the schools at each grade, only two session types, mathematics and mathematics estimation, were possible. In the remaining two-thirds of schools, up to a maximum of four session types for grade 4 or five session types at grades 8 or 12 could have been conducted. At grade 12, only one advanced session—either mathematics or science—was conducted.

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[1] Lucy M. Gray and Mark M. Waksberg assist in survey operations and field activities for the NAEP assessments, under the direction of Nancy W. Caldwell.

Historically, a small proportion (less than 10%) of the sampled students have been "excluded" from NAEP assessment sessions because, according to school records, they are students with either disabilities or limited English language proficiency who have been determined to be incapable of participating meaningfully in the assessment. More recently, especially with the passage of the Individuals with Disabilities Education Act, increased attention has been given to these students and to including as many of them as possible in NAEP sessions (and in other testing situations as well). NAEP has addressed these concerns, first in the 1995 field test and continuing with the 1996 operational assessment, through a Special Study that uses both old and new "inclusion" criteria and (in some schools) offers accommodations for testing students with disabilities and/or limited English proficiency (SD/LEP). For the 1996 main assessment, a split-sample design was used, placing the sampled schools into three subsamples, so that the impact of both the new SD/LEP criteria and the provision of accommodations could be evaluated, while also collecting data with the old criteria to maintain comparability with previous NAEP data bases. This Special Study was incorporated in the main assessment but was not a part of the 1996 long-term trend assessment. The information in this chapter and in Chapter 3 applies to all three sample types or subsamples.

For administrative purposes, the main and long-term trend assessments were conducted in different schools. Responsibility for the assessments in long-term trend schools was given to one group of assessment supervisors, while responsibility for the main assessment was assigned to another group of supervisors. Since these supervisors worked in some of the same areas and sometimes in the same school districts, careful coordination was required.

In order to reduce the burden on the participating schools, national assessment field staff performed most of the work associated with the assessments. Introductory contacts and meetings were held in the fall (1995) to enlist cooperation and explain the assessment procedures to district and school representatives and to set a mutually agreed-upon assessment date for each school. The assessment supervisor visited the school to select the sample of students a week or two before the assessment. The assessment sessions were conducted by national assessment field staff, called exercise administrators, under the direction of the assessment supervisor. At the conclusion of the assessment in a school, field staff coded demographic information on the booklet covers and shipped the completed materials to National Computer Systems (NCS), the processing subcontractor for NAEP (see Chapter 6 for more detailed information on processing assessment materials).

5.2 PREPARING FOR THE ASSESSMENTS

5.2.1 Gaining the Cooperation of Sampled Schools

The process of gaining cooperation of the schools selected for the national assessment began in late August 1995 with a series of letters and contacts with state and district-level officials. The National Center for Education Statistics (NCES) first sent each jurisdiction a letter announcing NAEP plans for 1996. Westat then contacted the State Test Directors or NAEP State Coordinators in each sampled state to notify them of the districts and schools selected in their states. In the 40 jurisdictions participating in the State Assessment that also had schools sampled for the national assessment, the state received the list of districts and schools sampled for both the national and state assessments.

From September through early December 1995, Westat sent lists of schools sampled for the national assessment component and other NAEP materials to district superintendents, diocesan superintendents of Catholic schools, and principals or heads of schools in other nonpublic schools, inviting their participation. These initial mailings paved the way for telephone contacts by NAEP field supervisors who were assigned the task of gaining cooperation and scheduling assessment dates.

The schedule for project activities for the 1996 main and long-term trend assessments was as follows:

Date	Activity
Mid-August 1995	Department of Education sent first letter to Chief State School Officers about the 1996 assessment.
August 27 - 31, 1995	Training sessions were held for long-term trend assessment supervisors.
September 7 - 9, 1995	Training sessions were held for main assessment schedulers.
Mid-September 1995	Westat sent state coordinators a list of their schools initially selected for either or both major components.
Mid-to-Late September 1995	Westat sent samples and informational materials to districts if not already sent by state coordinators.
Mid-September - December 1, 1995	Supervisors contacted districts and schools to secure cooperation and to schedule assessments.
	Supervisors conducted introductory meetings for the national assessment, by telephone (or in person if requested by districts/schools). Westat selected substitutes for refusals.
	Supervisors recruited, hired, and trained exercise administrators.
October 9 - December 22, 1995	Fall long-term trend assessments were administered.
Early December 1995	Supervisors sent informational materials to principals and school coordinators. Letter confirming assessment schedule sent to each school from Westat.
December 9 - 13, 1995	Main assessment supervisor training session was held.
January 3 - March 29, 1996	Main assessments were administered.[2]
January 3 - March 8, 1996	Winter long-term trend assessments were administered.
March 11 - May 10, 1996	Spring long-term trend assessments were administered.

5.2.2 Supervisor Training

Training for assessment supervisors was multi-phased and involved separate sessions conducted in August, September, and December 1995. All training was conducted by the Westat project director, field director, and home office staff. Also in attendance were representatives from Educational Testing Service (ETS), NCS, and NCES.

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[2] Final makeup sessions were held April 1-5, 1996.

The first of these training sessions was held August 27-31, 1995 in Baltimore, Maryland for field staff assigned to the long-term trend program for 1996. Attending the session were the long-term trend field manager, the 11 field supervisors responsible for conducting the long-term trend assessments, and 4 troubleshooters.

After an introduction to the study, which included the background and history of NAEP, an overview of the long-term trend assessments, and the 1995-1996 assessment schedule, the training continued with a thorough (2 half-day sessions) presentation of NAEP contact/gaining cooperation activities. This is a lengthy process of contacting states, districts, and schools regarding their participation in and scheduling for NAEP; several demonstration phone calls, role plays, and exercises were used to provide some practical experience during this part of the training. The long-term trend staff was also trained on setting assessment schedules, recruiting/hiring/training exercise administrators, and sample selection and preparation of Administration Schedules and other assessment materials. Several practice exercises were used to demonstrate these topics. The training concluded with: discussions of conducting the session and using the session script; preparing school worksheets and holding makeup sessions; post-assessment activities; and Westat administrative procedures.

After an overview of NAEP and introductory remarks on the study schedule, the main assessment group of about 25 supervisors received extensive training (similar to the August training for long-term trend) in contacting the schools, gaining cooperation and scheduling the assessments; numerous demonstrations, role plays and exercises were used. Other training topics included: supervisory responsibilities; setting the assessment schedule; recruiting and training exercise administrators; and administrative forms and procedures. The scheduling supervisors also received a full day of training on using the reporting system installed on the laptop computers assigned to each of them for the gaining cooperation/scheduling phase.

The 75 NAEP supervisors who were responsible for main assessment activities were trained during a third session, held December 9-13, 1995. Training focused on a review of the preliminary activities during the fall including results of initial contacts with districts and schools, scheduling of assessments, the status of exercise administrators' recruitment, and a thorough discussion of assessment activities: sampling procedures; inclusion of SD/LEP students; teacher surveys; providing testing accommodations; conducting science sessions; and administrative forms and procedures. Westat's classroom management videotape was also shown at this training session.

The main and state assessment field managers were present at the December session to support training activities and answer questions concerning districts and schools that fell into the samples for more than one component of the assessment. Each supervisor also met with the person who completed the scheduling in their area, as a first step in preparing for the new supervisors' contacts with each school (and district, if needed).

5.2.3 Contacting Districts and Nonpublic Schools

Once the supervisors were trained in August and September, they began working on obtaining cooperation. In states participating in the State Assessment, the assessment supervisor first spoke with the State field manager to determine what contacts, if any, had already been made with districts about the national assessment. The approach the supervisors took when calling superintendents depended on whether the district had been notified about NAEP by the State Coordinator and whether the district also had schools selected for the State Assessment. For districts that had been contacted by the State Coordinator, the supervisor began by referring to that contact.

In previous NAEP assessments, the supervisors offered and usually held "introductory meetings" with representatives from the superintendents' offices and the selected schools, typically the superintendent and the principals. These served as both an introduction to NAEP and a presentation on what would be asked of the school. The meetings were also used to establish a schedule for the sampling visits and the assessments in the schools.

However, over the years, these meetings have become somewhat redundant since many districts have fallen into the NAEP sample more than one time. It has also become more and more difficult to schedule these meetings, as district and school officials find it harder to allot time away from their offices. Thus, beginning with the fall 1995 preparation for the 1996 study, the material was almost always presented to the superintendents and principals during telephone calls rather than in formal meetings. Generally, only if an in-person meeting was specifically requested by the district or school officials, or if the supervisor felt that there was a better chance of convincing a district to participate in person, was such a meeting held.

As the supervisors contacted superintendents, principals, and nonpublic school officials to introduce NAEP and determine the schools' cooperation status, they completed two forms and entered the school status in the receipt control system installed on their laptop computers. The Results of Contact Form was completed to document the discussion the supervisor had with each administrator concerning the district's willingness to participate and any special circumstances regarding the schools' cooperation or assessments.

The supervisor also completed portions of a School Control Form. This form was preprinted with the number and types of assessment sessions assigned to the school, so that this information could then be shared with the district/school official. Information gathered during the phone call, including the name of the person designated to be the school coordinator, the number of students in the designated grade, tentative dates for the sampling visit and assessment, and other information that could have some bearing on the assessment, was recorded on the form. This information was used to update records in the home office. In December, the forms were provided to the supervisors who would be conducting the assessments.

A small number of in-person introductory meetings were held. The New York City and Los Angeles City school districts have previously used these meetings to present information about the NAEP assessments to the officials of all the selected schools and to encourage their participation, and wished to continue that practice for the current assessment. A small number of other school districts also requested such a meeting, involving representatives from their selected schools so that they would have a full understanding of what the assessments entailed.

During the telephone presentation or the introductory meeting, the supervisor discussed arrangements for the assessments with representatives from each school. Within the weeks scheduled for the PSU, the supervisor had the flexibility to set each school's assessment date in coordination with school staff. The staff sometimes expressed preferences for a particular day or dates or had particular times when the assessment could not be scheduled. Their preferences or restrictions depended on the events that had already been scheduled on their school calendar. Using this information from the schools, the supervisors set up the assessment schedule for each PSU.

The supervisor usually learned during the introductory contact whether a school required some form of parental notification or permission. Three versions of standard NAEP letters were offered for the school's use, and each letter could be produced for selected students only or for all eligible students. The first version informs parents about the assessment. The second assumes parental consent unless parents send the form back stating that they do not want their child to participate in the assessment. The third version requires that parents sign and return the form before students can be assessed. All versions of the letter were available to the schools, although when the issue of parental permission came up in discussion, supervisors offered the least restrictive version that met the requirements of the school or district. In addition, Spanish language versions of the parent information letter were made available to the schools. Schools could also send out their own letters and notices if they preferred not to use those offered through NAEP. Information on whether the school required parent letters and the type of letter used was recorded on the School Control Form.

5.2.4 Recruiting, Hiring, and Training Exercise Administrators

During the fall, while the supervisors were contacting their schools and scheduling assessments, their other major responsibility was to recruit and hire exercise administrators, who would administer the assessment sessions. Exercise administrators were recruited from many sources. Each supervisor was given a PSU-by-PSU computerized list of exercise administrators and other field staff who had worked previously on education studies for Westat. People who had served as exercise administrators before, with good evaluations from their previous supervisors, were usually the first considered for hiring. Subsequently, during contacts with the schools, the supervisors asked the school principals and other staff to recommend potential exercise administrators. These referrals were frequently retired teachers or substitutes. Finally, where necessary, ads were placed in local newspapers and the employment service was notified.

Supervisors were told that, in general, four to five exercise administrators should be hired for each PSU, although a variety of factors might influence the actual number. The number of schools in a PSU, the size of the student sample in each school, distances to be traveled, the geography of the area, and weather conditions during the assessment period were all factors taken into consideration by supervisors in developing their plan for hiring exercise administrators.

A few supervisors, whose NAEP assignments contained contiguous PSUs, hired the same exercise administrators to work in all their PSUs. Other supervisors, whose assignments comprised PSUs that were not geographically connected, tended to hire teams of exercise administrators for each PSU. Supervisors were encouraged to hire locally and to hire individuals with teaching experience and the ability to handle classroom situations.

The scheduling supervisors, all of whom were experienced NAEP supervisors, had complete responsibility for recruiting, hiring, and training all of the exercise administrators, including ones who would report to different assessment supervisors. The training was standardized so that all supervisors used a prepared script and exercises to train the exercise administrators.

Each exercise administrator received an exercise administrator manual, which covered the full range of their job responsibilities. After studying the manual, they attended a half-day training session. During the training, the supervisor reviewed all aspects of the exercise administrators' job including preparing materials, booklets, and Administration Schedules for assessments; the actual conduct of the session; post-assessment collection of materials; coding booklet covers; recordkeeping; and administrative matters. In January 1996, each exercise administrator attended a shorter, refresher training session, conducted by the assessment supervisor, to gain further experience with the auxiliary materials, such as mathematics manipulatives and science kits, to be used in specific assessment sessions.

5.3 SELECTING THE STUDENT SAMPLE FOR MAIN NAEP

5.3.1 Grade-Eligible Sample

After securing cooperation from the school, the first scheduled visit to the school was made to select the sample of students to take part in the main assessments, and to conclude the arrangements for the actual testing. This visit was made in January by the supervisor responsible for the assessments in the school. Upon arriving at the school (rarely, sampling was done at the district office instead of in the school), the supervisor first reviewed the list of grade-eligible students and confirmed with the school coordinator that all eligible students were listed. If any eligible students were omitted, sampling could not proceed until the list was completed.

Using the computer-generated Session Assignment Form (SAF) for the main assessment, which was specific to the school, the supervisor selected the sample of students to be assessed. The SAF documented the types of sessions to be administered, the anticipated number of students to be assessed, the expected number of students eligible for the assessment, and a series of line numbers designating the students to be sampled. Those eligible students on the school's master list whose line numbers were shown on the SAF were selected for the assessment. After making sure that all eligible students had been listed, the supervisor numbered the students on the master list. If the total number of eligible students was within the minimum and maximum limits indicated on the SAF, the supervisor could proceed to select the sample. If the number was outside the limits, the supervisor called Westat for additional sampling instructions. With either the original instructions or revised line numbers, the supervisor proceeded to select the sample of students. The SAFs provided step-by-step instructions for sampling, indicating not just the line number of each student to be selected, but the type of assessment session for which each student was selected.

Once students were assigned to sessions, the supervisor and exercise administrators filled out an Administration Schedule for each session. The Administration Schedule is the primary control document for the assessment. It is used to list each sampled student and is the only link between booklets and students. The sample was designed so that about 30 students were assigned to each session. The supervisor discussed the final schedule of the sessions with the school coordinator and the date, time, and location of each session were filled in on the Administration Schedules. Because student names were recorded on the Administration Schedules, those forms remained in the schools after the sample was drawn.

The supervisor then asked the school coordinator to identify any students in the sample with an Individualized Education Program (IEP) (for reasons other than being gifted and talented) and/or who were designated as LEP. Any student with either (or both) of these designations was to be indicated on the Administration Schedules. The school was asked to complete an SD/LEP Student Questionnaire for each student with this designation. This was to be completed by a teacher, counselor or other school official who knew the designated student well.

The school coordinator was also asked to determine whether any of these students should be excluded from NAEP based on the criteria for assessing SD/LEP students (discussed in detail in Section 5.3.2).[3] Preliminary results indicate that less than half of the students with SD and/or LEP designations were excluded from the assessment. If the school coordinator could not identify the excluded students while the supervisor was at the school, the instructions were left with the Coordinator along with blank copies of the SD/LEP Student Questionnaire. In those cases, the Coordinator consulted with other school officials and informed the supervisor as to who was to be excluded when he/she returned for the assessment.

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[3] The criteria differs for the main and long-term trend assessments.

At the end of the sampling visit, if requested by the school, the supervisor and/or exercise administrators made lists of the sampled students for the teachers and/or completed appointment cards notifying students about their assessment schedule. Teacher notification letters were also prepared in some schools, which explained the assessment and listed the students who had been selected.

5.3.2 Sampling for Special Studies

Two special studies, requiring added steps in the sampling process, were included in the main assessment for 1996. (The special studies were not a part of the long-term trend component.) One of these special studies involved students eligible for advanced mathematics or science sessions. The other involved applying two versions of the SD/LEP "inclusion" criteria for NAEP assessments and, in some schools, offering accommodations for testing students designated as SD/LEP.

❖ Advanced Sessions

Samples of advanced mathematics or advanced science students were designated by separate series of line numbers on the SAF as was done for the other session types scheduled for a school. However, before these students could be listed on the Administration Schedule for the advanced session, it was necessary to check each selected student's eligibility using lists of students in advanced courses prepared by the school. The definitions of advanced students were as follows:

- Grade 8 Mathematics: students enrolled in Algebra 1 or beyond at anytime during the 1995-96 school year;
- Grade 12 Mathematics: students enrolled in Algebra 3, Pre-Calculus, Calculus and Analytic Geometry, Calculus or AP Calculus; and
- Grade 12 Science: students enrolled in AP Biology, Chemistry 2 (AP), Physics 1, Physics 2 without Calculus, and Physics 2 (AP).

The advanced sessions were available only at grade 8 in mathematics and grade 12 in mathematics and science. Of the students designated for advanced sessions as per the line numbers on the SAF, only those who were also eligible (according to the definitions above) were actually listed on the Administration Schedules for the advanced sessions.

One further sampling step was applied in grade 8 and grade 12 schools regardless of whether the school was actually scheduled for an advanced session. After the samples for all sessions were selected, the supervisors compared the school's lists of advanced students against the students selected for each session to determine those students who were eligible for an advanced session. This did not mean that all eligible students would take the advanced session (only those selected and eligible for an advanced session were actually assessed at the advanced level), but the eligibility status was then recorded on the Administration Schedules for all sessions to provide a source of information on the extent to which the school offered advanced mathematics and science courses.

SD/LEP Sampling and Inclusion Criteria

Because of increased interest throughout the education community in assessing as many students as possible, NAEP has begun to evaluate the effects of using revised criteria for inclusion of SD/LEP students and providing testing accommodations that are usually offered to these students by their schools. For the 1996 study, the school sample was divided into three subsamples by the statisticians at Westat. The purpose of the subsamples was to: collect data under the same conditions as previous studies in order to maintain trend in mathematics within NAEP; evaluate the impact of a revised, more specific set of inclusion criteria; and evaluate the combined effect of the new criteria and the use of accommodations for testing students. The three subsamples of schools were defined as follows:

S1 (Sample 1)	These schools used the criteria from 1990 and 1992, and accommodations were not provided. Since the issue of "trend" applies to mathematics and not to science, only mathematics was assessed in these schools.
S2 (Sample 2)	These schools used the new 1996 criteria, but accommodations were not offered. This was designed to evaluate only the impact of changing the criteria.
S3 (Sample 3)	These schools applied the new 1996 criteria and the accommodations most commonly used for achievement testing were offered. For LEP students, the adaptations included a bilingual (English-Spanish) version of the mathematics assessment and a Spanish-language glossary for the science assessment. For IEP students, the accommodations included: small group or one-on-one assessments, untimed assessments, and reading aloud. Large-print and Braille booklets were also offered in some mathematics sessions.

During the sampling visit, after the samples of students were selected for each session, the schools were asked to identify any sampled students whom the school considered to be SD/LEP. The school was then asked to complete an SD/LEP Questionnaire regarding each of these students. These basic steps were consistent with previous studies and did not vary among the three types of schools.

Further, the schools were asked to indicate which of the SD/LEP students should be included in the assessment and which should not. Again, this step is consistent with previous studies, but in 1996, the specific criteria and availability of accommodations varied among the three types of schools. Each school based its decisions about assessing SD/LEP students on the specific criteria provided to that school.

To produce as large a sample as possible of students from which to evaluate the new criteria and procedures, SD/LEP students were oversampled in certain session types in some schools. This was the case for mathematics sessions at grades 4, 8, and 12 in S2 schools and in both mathematics and science sessions at all three grades in S3 schools. The oversampled students were added to the appropriate Administration Schedules (according to the instructions on the SAF) as part of the sampling process.

The SAF contained specific instructions on oversampling for the NAEP supervisor if it was required in a particular school. Oversampling of SD/LEP students was performed only in S2 and S3 schools, and the "pool" from which the oversample was selected varied according to the grade to be assessed and the types of sessions scheduled.

The pool was defined as:

- Grade 4 - any IEP and/or LEP students from the grade-eligible list who were not selected for any session type; or
- Grade 8 or 12 with an advanced session - any IEP and/or LEP students preselected for an advanced session but not eligible for that session; or
- Grade 8 or 12 with no advanced session - any IEP and/or LEP students from the grade-eligible list who were not selected for any session type.

For the supervisors to select the oversample correctly, it was necessary to first complete the sampling for every session in the school and to be sure that the school had provided IEP and/or LEP status for every student on the grade-eligible list (i.e., not just for the selected students).

Once the oversample pool was established for a particular school, the supervisor numbered (consecutively) the students in the pool. (This was essentially a renumbering and was done separately from the original numbering of all students on the list). The oversample was then selected using the oversampling line numbers specified on the SAF. Students were added to either regular mathematics or regular science sessions according to the specifications on the SAF. The names of the oversampled students were inserted at the end of the appropriate Administration Schedule. The school was asked to complete an SD/LEP Questionnaire on each such student and to determine whether the student should be included in the assessment and, for S3 schools, what specific testing accommodation(s), if any, are called for in the students IEP and/or are normally provided for each student by the school.

The unweighted results of the 1996 assessments show that the sampling process generated, in total, 15,871 students to be assessed in S1 schools, 48,769 to be assessed to S2 schools, and 41,513 in S3 schools. These counts include the SD/LEP students that the schools determined should participate in the assessments. Accommodations were used in just over 200 S3 schools (about 30%) for approximately 1,050 students. The most frequently provided accommodations were small group, extended time (untimed testing), and bilingual assessment booklets. These results are very preliminary, however, because they are unweighted and cannot be used to compare results for S1, S2, and S3 schools (without applying the weighting process). Detailed information and results of the SD/LEP special study will be provided in a separate report.

5.4 CONDUCTING THE ASSESSMENT SESSIONS

The primary responsibility for conducting assessment sessions was given to the exercise administrators. Supervisors were required to observe the first session each exercise administrator conducted to ensure that they followed the procedures properly. Supervisors were also required to be present in all schools with more than one small session to be conducted. The supervisor plays an important role as the liaison between the national assessment and school staff ensuring that the assessments go smoothly.

To ensure that sessions were administered in a uniform way, the exercise administrator was provided with scripts for each session type. The scripts were to be read verbatim. The scripts began with a brief introduction to the study. The exercise administrator was then directed to distribute the booklets, being careful to match the student with the preassigned booklet.

After the booklets were distributed, some additional, scripted directions were read. Students were asked to write in the NAEP school ID (except in grade 4, where NAEP staff entered the ID) and their home ZIP code on the cover of the booklet, and given some general directions in completing the assessment. For fourth grade students, all of the background questions were then read aloud by the exercise administrator; at the upper grades, the first question, which asks the students' race/ethnicity, was read by the exercise administrator, and the students read the rest to themselves. After the background questions were completed, the students were told that any further questions they might have could not be answered by the exercise administrator, and that they were to begin the first cognitive section of the assessment. This process (along with the script) was modified somewhat for science where the background questions were at the end of the assessment booklet, and none of the items was read aloud at grades 8 or 12.

During the sessions, the exercise administrators walked around the room monitoring the students to make sure they were working in the correct section of their booklet and to discourage them from looking at a neighbor's booklet.

At the end of each assessment session, booklets were collected and students dismissed according to the school's policy. The exercise administrator was then responsible for completing the information at the top of the Administration Schedule, totaling the number of participating students, and coding the covers of all booklets, including those booklets assigned to absent students.

5.5 RESULTS OF THE MAIN NAEP ASSESSMENT

5.5.1 School and Student Participation

The unweighted school response rate for the main assessments in 1996 was 82 percent. The final sample of cooperating schools included 604 schools at grade 4, 592 schools at grade 8, and 591 schools at grade 12. Table 5-1 shows comparative response rates for the last four assessment periods.

Unlike the student response rates, there has been a small but steady decline in the main assessment school response rates over the last several assessment periods. This has occurred despite persistent efforts to convert schools and districts that indicate that they are not interested in participating in the assessments. Both Westat field managers and ETS staff have been employed in these conversion efforts.

Table 5-1

Comparison of Student and School Response Rates for Main NAEP, 1990-1996

	1990	**1992**	**1994**	**1996**
Student response				
Grade 4	92.9	93.4	93.2	95.5
Grade 8	89.0	88.8	91.0	93.2
Grade 12	80.8	80.8	81.1	80.1
School response				
Grade 4	88.3	86.4	86.0	85.8
Grade 8	86.7	85.3	85.5	81.9
Grade 12	81.3	81.5	78.6	78.7

The most frequently stated reason for school and district refusals has been the increase in testing throughout the jurisdictions and the resulting difficulty in finding time in the school schedule to conduct the NAEP assessments. With so many states now mandating their own testing, school schedules are becoming tighter, and administrators are finding it increasingly difficult to accommodate outside testing. Despite the increased visibility and publicity surrounding NAEP, schools are reluctantly finding it necessary to decline participation as a result of the increasing demands on their students' time.

Of the 113,846 students sampled for the 1996 assessment, roughly five percent overall were excluded by schools. Altogether, 94,157 students were assessed across all three grades: 28,528 students were assessed at fourth grade, 32,339 were assessed at eighth grade, and 33,290 students were assessed at twelfth grade. The overall student participation rate was 88.7 percent (after eliminating any withdrawn and excluded students).

The response rate at which supervisors were required to conduct a makeup session was raised from the standard that had been used in previous main assessments. The previous rates of 75 percent and 85 percent (in 1994 only) were changed to 90 percent for 1996, that is, any session (or group of sessions within the same subject area) at which fewer than 90 percent of the eligible students were assessed would require a makeup session (assuming that the school was willing to schedule one). This change resulted in 129 schools conducting makeup sessions that would not have been required to do so under the 85 percent rule. In these schools, an additional 595 students were assessed. These 595 students served to increase the overall response by less than one percentage point (0.6%). The greatest increase was at the grade 12 level, where 413 students were assessed in these additional sessions, which raised the response rate for this group of students by about one percentage point.

5.5.2 Assessment Questionnaires

Westat provided each school with a School Characteristics and Policies Questionnaire a few weeks before the assessment was scheduled to be conducted (i.e., at the time of sampling). At the same time, supervisors prepared an SD/LEP Student Questionnaire for each sampled student with either an IEP and/or LEP designation, with the request that it be completed by someone at the school knowledgeable about that student.

Selected teachers of fourth- and eighth-grade mathematics and science were asked to fill out Teacher Questionnaires. The teachers asked to participate were the mathematics or science teachers of those students selected for the assessment so that the teacher data could be linked to student performance data. The Teacher Questionnaire for grade 4 was combined into one form since it is recognized that at this grade level, the same teacher would probably teach all of the subjects. For grade 8, there were two distinct questionnaires, one for mathematics teachers and the other for science teachers. At grade 12, a teacher questionnaire was used only for advanced mathematics sessions.

The supervisor requested that the Teacher Questionnaires be distributed as quickly as possible after the sampling so that they could be returned by the day of the assessment. Additional introductory materials were included with the Teacher Questionnaires in response to questions that teachers have had in the past about the importance of completing the questionnaires and about NAEP in general. Teachers received a letter explaining the purpose of the Questionnaire, along with background materials about NAEP.

If the Teacher Questionnaires were not complete at the time of the assessment, the supervisor left a postage-paid envelope to NCS to be used to return the questionnaires. Table 5-2 shows the number of questionnaires distributed and the number completed.

Table 5-2

Background Questionnaires Received for Schools, Teachers, and SD/LEP Students in the 1996 Main Assessment[1]

Grade Assessed	School Characteristics and Policy Questionnaire	Teacher Questionnaires			SD/LEP Student Questionnaire
		Mathematics/Science (grade 4 only)	Mathematics	Science	
Grade 4					
Number expected	605	1,601	NA	NA	5,116
Number received	577	1,601	NA	NA	4,885
Percent received	95%	100%	NA	NA	95%
Grade 8					
Number expected	592	NA	1,400	844	5,048
Number received	554	NA	1,365	802	4,770
Percent received	94%	NA	98%	95%	94%
Grade 12[2]					
Number expected	593	NA	475	NA	4,147
Number received	546	NA	475	NA	3,806
Percent received	92%	NA	100%	NA	92%

[1] The numbers in this table reflect the full samples, including S1, S2, and S3.

[2] At grade 12, teacher questionnaires were used only for teachers of advanced mathematics. Thus, no data were collected from science teachers, and the data shown here represent teachers of advanced mathematics only.

5.6 LONG-TERM TREND ASSESSMENTS

5.6.1 Overview

To provide continuity and comparability with past NAEP studies, the long-term trend component (formerly referred to as the "bridge" assessments) replicates procedures and materials that have been used since the inception of NAEP. Student eligibility in long-term trend is always based on criteria used in years prior to 1988 (when the modal grade for students aged 17 changed from the grade 11 to grade 12). The 1996 schedule for long-term trend assessments was as follows: the fall assessment of age 13/grade 8 students was held in the 11-week period from October 9 through December 22, 1995; the winter assessment of age 9/grade 4 students was held during the 10-week period from January 3 through March 8, 1996; and the spring trend assessment of students who were age 17/grade 11 was conducted in the 9-week period from March 11 through May 10, 1996. Students were assessed in reading, writing, mathematics, and science.

Paced tape sessions were conducted with samples of age-eligible students only, as was done in all previous years. Additional samples of age- and grade-eligible students were assessed with spiral (print-administered) booklets, following procedures initiated in 1984. Six different types of sessions were conducted: one print-administered and five separate tape-administered sessions. Depending on the size of the school, up to four different session types, involving a total of about 80 students, might have been conducted in a participating school.

5.6.2 Selecting the Student Sample

Procedures for sampling in long-term trend schools were very similar to those employed in the schools selected for the main assessment. One to two weeks before the assessment, the supervisor visited the school to select the sample. Lists of students were reviewed to ensure that all age- and grade-eligible students were listed. The SAF for long-term trend schools specified a range for the expected number of eligible students. If the total number of students was within this allowable range, the sampling could proceed. Otherwise, the supervisor called Westat for additional sampling instructions. The SAF directed the supervisor to assign students to long-term trend session types based on their line numbers from the student list that the school had prepared. (The SAFs for the long-term trend sample were like those used in long-term trend sampling for previous years, and were distinct from the SAFs for the main assessment that were described earlier in this report.)

The only major variation within the sampling for long-term trend assessments was that, for the tape sessions, only age-eligible students were selected. For these sessions, the supervisor selected from the entire list of students (age- and grade-eligible), but then deleted those who were only grade-eligible before recording the names of the students to be assessed on the Administration Schedules.

The criteria for excluding students were also different for the long-term trend schools (compared to the main assessment), and again followed the criteria that were established previously for long-term trend. For those students who were excluded, the school was asked to complete an Excluded Student Questionnaire. If the school coordinator could not identify the excluded students while the supervisor was at the school, a set of instructions for excluding students was left with the coordinator along with the estimated number of questionnaires that would be needed.

5.6.3 Conduct of the Assessment

The conduct of the assessments in schools selected for the long-term trend program is essentially the same as in the schools selected for the main assessment. Scripts are provided for the supervisors and exercise administrators to use in administering the sessions. The major difference compared to main assessment is that most of the sessions are tape administered. In these sessions, after the distribution of the test booklets, the administrator is instructed to turn on the tape recorder. The remainder of the instructions are contained on the tape, and the timing is determined by the length of time that the tape runs.

5.6.4 Results of Long-Term Trend Assessments

The unweighted school response rate for the 1996 long-term trend assessments was 83 percent. The final sample of cooperating schools included 240 schools at age 9/grade 4, and 238 schools at age 13/grade 8, and 191 schools at age 17/grade 11. Nearly 30,000 students were assessed in long-term trend, or 91 percent of those eligible to be assessed.

Of the 36,371 students sampled for long-term trend assessments, eight percent were excluded by the schools. Overall, 29,791 students were assessed across all three age/grade groups: 10,432 students were assessed at age 9/grade 4, 11,151 students were assessed at age 13/grade 8, and 8,208 were assessed at age 17/grade 11. Table 5-3 shows comparative response rates for the last four long-term trend assessments.

Table 5-3

Comparison of Student and School Response Rates for Long-Term Trend NAEP, 1990-1996

	1990	1992	1994	1996[1]
Student response				
Grade 4	92.4	94.0	94.2	95.5
Grade 8	90.4	90.8	92.2	91.9
Grade 12	81.2	82.8	84.1	84.0
School response				
Grade 4	88.1	87.4	86.7	84.8
Grade 8	90.5	84.7	81.7	82.4
Grade 12	80.7	81.3	81.1	81.3

[1] The numbers in this table reflect the full samples, including S1, S2, and S3.

5.6.5 Assessment Questionnaires

The School Characteristics and Policies Questionnaire and the Excluded Student Questionnaire are forms that were distributed in the schools to be completed by school personnel. The School Characteristics and Policies Questionnaire was provided to the school by the assessment supervisor at the time of the sampling visit. This form was to be filled out by the principal or other staff member knowledgeable about the school's administrative policies and staff characteristics. The supervisors collected the completed questionnaire when they returned to the school for the assessment.

An Excluded Student Questionnaire was to be filled out for every student who was sampled for the assessment but excluded by the school. Following exclusion criteria used in previous long-term trend assessments, schools could exclude students with limited English-speaking ability, those who were educable mentally retarded, or functionally disabled students, if in the judgment of school staff or as indicated in school records, they were unable to "participate meaningfully" in the assessment. After the sample of students was drawn and Administration Schedules prepared, the supervisor requested that the school coordinator identify any students who should be excluded. The supervisor then gave an Excluded Student Questionnaire to the coordinator for every excluded student, with the request that it be completed by someone in the school knowledgeable about the student. (Note that this varies somewhat from the main assessment where questionnaires are assigned for all sampled students with an IEP and/or LEP, not just for those who are excluded from the assessment.)

The supervisor attempted to collect all completed questionnaires (School Characteristics and Policies Questionnaire and Excluded Student) on the assessment day. If the questionnaires were not ready, and it was convenient for the supervisor or an exercise administrator to return to the school later to pick them up, they would do so. Otherwise, the supervisor gave the coordinator a postage-paid envelope to use to mail the forms to NCS. All (100%) of the School Characteristics and Policies Questionnaires were completed and returned, and 95.9 percent of the Excluded Student Questionnaires were returned.

Once the assessments were completed in a school, the supervisor and exercise administrators completed the coding of the front covers of the assessment booklets, filled out the necessary forms, and shipped the booklets and forms to NCS. A copy of all forms was sent to Westat so that progress in the field could be closely monitored.

The School Worksheet was used by the supervisor to summarize the results of the assessment sessions in each school. The number of students to be assessed, the number actually assessed, and the number absent were entered so that the supervisor could calculate whether a makeup session was required. Attendance of less than 90 percent required a makeup. If a makeup was required for one or more session types, the supervisor discussed the scheduling of the makeup with the school coordinator.

In long-term trend assessments prior to 1994, the percentage of students attending that would necessitate a makeup session was 75 percent or below. For 1994, this rate was increased to 85 percent, and it was raised again to 90 percent for 1996. By raising the rate to 90 percent, an additional 144 students were assessed in 73 schools, compared to the 85-percent-rule, increasing the overall student response rate for 1996 by less than one-half of one percentage point (0.44%).

The top (original) copy of the School Worksheet, any Excluded Student Questionnaires completed by the school, and the Administration Schedules (with the students' names removed and left at the school) were included with the booklets in the shipment to NCS. In addition, the supervisor included a packing list with the materials, which inventoried the assessment materials assigned to and returned from the school.

5.7 FIELD MANAGEMENT

Two field managers monitored the work of 25 scheduling supervisors who worked during fall 1995 to gain cooperation of districts and schools for the main assessment. During the assessment period, these staff were expanded to about 75 supervisors and 6 field managers (4 of whom were located in Westat's home office). An additional field manager was assigned exclusively to long-term trend NAEP throughout the gaining cooperation and assessment periods. All supervisors reported directly to their field managers who, in turn, reported to Westat's field director. All contacts were made at least weekly.

An automated management system was developed and maintained in Westat's home office. The scheduling supervisors working to contact schools during the fall used this system on their portable computers. The system contained a record for each sampled school. A disposition code structure was developed to indicate the status of each school's participation (e.g., school cooperating, decision pending, school refusal, district refusal, school closed, etc.). As a school's status was determined, the scheduling supervisors entered the status of the school onto their computers, and this information was downloaded onto the home office system on a weekly basis. Disposition reports were then generated from the receipt system once a week so that home office staff could review the progress of securing cooperation from the sampled schools.

These reports were an invaluable tool for the sampling statisticians as well as for the field director and field management staff. They provided the statisticians with the information needed to determine whether the sample of schools was adequate to produce representative results. Based on the information contained in these reports, the sampling statisticians selected substitute schools to replace some of the non-cooperating schools.

After assessments were completed, the system was used to enter data from the School Worksheets (for both Main NAEP and long-term trend) on the number of students to be assessed, the number assessed, and the number absent for each school. Data on completed questionnaires received was provided by NCS. The system was also used to alter school assessment dates, particularly when bad weather required a change in schedule, and to monitor plans for and progress in conducting makeup sessions. Reports were generated weekly during the assessment period that allowed the project staff to monitor the progress of the assessments both in terms of checking that the schools were assessed on schedule as well as assuring that a high response rate was achieved. The sampling statisticians used these reports to monitor the sample yield by school, PSU, and age/grade level.

Progress of the assessments was constantly monitored through telephone reports held between NAEP supervisors, field managers, and home office staff. During these phone conversations, the supervisors' schedules were reviewed and updated, and any problems that the supervisors were experiencing were discussed. Much of the attention this year was focused on maintaining the schedule in light of the many postponements due to severe winter weather.

The supervisors who traveled filled out a Work Schedule for a one- to two-week period, showing their whereabouts, so that they could be contacted if necessary. It also allowed field managers and project staff to review the supervisors' schedules and the distribution of work.

Progress of the field work was also monitored during quality control visits made to the field by Westat and ETS office staff.

Chapter 6

PROCESSING ASSESSMENT MATERIALS[1]

Patrick B. Bourgeacq, Bradley Thayer, and Timothy Robinson
National Computer Systems

6.1 INTRODUCTION

This portion of the report reviews the activities conducted by National Computer Systems (NCS) for the NAEP 1996 main assessments in mathematics and science, and long-term trend assessments in reading, mathematics, science, and writing. As a subcontractor to Educational Testing Service (ETS), NCS was responsible for printing all of the NAEP student booklets and control documents; distributing the assessment materials to the field; receiving, tracking, processing and editing the assessment materials as they returned from the field; scoring all of the constructed-response items (in conjunction with ETS); and delivering the assessment data files to ETS for analysis and reporting.

For this assessment, NCS was charged with processing and scoring the largest assessment in the history of NAEP in the shortest amount of time. Further, image scanning processes, eliminating almost all paper handling during scoring and improving monitoring and reliability scoring, increased to nearly twice that of the 1994 assessment. Materials management and distribution of over one quarter of a million science kits, receipt control processing for all receipts within 48 hours, image scanning throughput increased nearly twice that of 1995, and professional scoring of over nine million constructed responses highlight the challenges met by NCS for the 1996 NAEP national and state assessments.

NCS processed more than 134,000 booklets for the NAEP 1996 national assessment, as shown in Tables 6-1 and 6-2. NCS also received and processed a total of over 2,300 school characteristics and policies questionnaires, over 4,700 teacher questionnaires, and over 16,274 SD/LEP questionnaires for the three grades, as shown in Table 6-3. Table 6-4 lists key events and dates in the NAEP schedule.

This chapter of the report reviews the activities conducted by NCS for the NAEP 1996 main and long-term trend assessments.

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[1] Bradley Thayer was the NCS project manager for 1996 NAEP, Patrick Bourgeacq was the NCS project director for 1996 NAEP scoring, and Timothy Robinson was the NCS senior processing coordinator for 1996 NAEP.

Table 6-1
Processing and Scoring Totals for the 1996 NAEP Assessment

	Booklets Processed	Number of Constructed-Response Items[1]	Number of Responses Scored[2]	Number of Scorers and Team Leaders[3]	Length of Training and Scoring
Fall Trend Reading/Writing	5,287	22	42,741	7 / 1	11/29/95 - 1/5/96
Fall Trend Mathematics	5,727	28	88,782	11 / 0	12/18/95 - 1/5/96
Winter Trend Reading/Writing	4,988	20	34,341	6 / 1	1/30/96 - 4/3/96
Winter Trend Mathematics	5,442	29	86,322	9 / 1	3/25/96 - 3/29/96
Spring Trend Reading/Writing	4,669	25	43,094	6 / 1	4/10/96 - 5/24/96
Spring Trend Mathematics	3,570	29	86,478	5 / 1	5/13/96 - 5/22/96
Long-Term Trend Writing Holistic	N/A	6	63,793	56 / 7	6/10/96 - 6/16/96
Long-Term Trend Writing Mechanics	N/A	3	2,329	33 / 6	7/15/96 - 7/31/96
1990 Rescore 4th Grade Mathematics	749	12	8,988	198 / 17	3/13/96 - 5/6/96
1990 Rescore 8th Grade Mathematics	730	18	13,374	198 / 17	3/13/96 - 5/6/96
1990 Rescore 12th Grade Mathematics	725	21	15,225	198 / 17	3/13/96 - 5/6/96
1992 Rescore 4th Grade Mathematics	2,498	36	27,031	198 / 17	3/13/96 - 5/6/96
1992 Rescore 8th Grade Mathematics	2,498	44	33,077	198 / 17	3/13/96 - 5/6/96
1992 Rescore 12th Grade Mathematics	2,498	44	32,387	198 / 17	3/13/96 - 5/6/96
National 4th Grade Mathematics Spiral	10,816	64	170,219	198 / 17	3/13/96 - 5/6/96
National 4th Grade Mathematics Estimation	2,128	3	7,756	198 / 17	3/13/96 - 5/6/96
National 4th Grade Mathematics Theme	4,038	13	29,750	198 / 17	3/13/96 - 5/6/96
National 8th Grade Mathematics Spiral	11,554	69	195,764	198 / 17	3/13/96 - 5/6/96

[1] This is the number of discrete constructed-response items in assessment booklets.

[2] This is the number of student responses to the constructed-response items. These scored responses include those that were rescored for reliability estimation.

[3] Because readers scored items from all grades and all types of booklets, it is not possible to break the numbers down by how many scored each classification of items.

(continued)

Table 6-1 (continued)

Processing and Scoring Totals for the 1996 NAEP Assessment

	Booklets Processed	Number of Constructed-Response Items[1]	Number of Responses Scored[2]	Number of Scorers and Team Leaders[3]	Length of Training and Scoring
National 8th Grade Mathematics Estimation	2,267	6	17,027	198 / 17	3/13/96 - 5/6/96
National 8th Grade Mathematics Theme	4,259	13	34,613	198 / 17	3/13/96 - 5/6/96
National 8th Grade Mathematics Advanced	2,382	14	41,693	198 / 17	3/13/96 - 5/6/96
National 12th Grade Mathematics Spiral	10,740	73	225,540	198 / 17	3/13/96 - 5/6/96
National 12th Grade Mathematics Estimation	1,883	0	0	198 / 17	3/13/96 - 5/6/96
National 12th Grade Mathematics Theme	3,892	12	29,210	198 / 17	3/13/96 - 5/6/96
National 12th Grade Mathematics Advanced	2,987	15	56,101	198 / 17	3/13/96 - 5/6/96
Bilingual 4th Grade Mathematics National	91	10	2,280	0 /4	5/2/96 - 5/2/96
Bilingual 8th Grade Mathematics National	36	12	1,080	0 /4	5/3/96 - 5/3/96
National 4th Grade Science Spiral	11,677	94	275,339	306 / 24	3/18/96 - 5/28/96
National 8th Grade Science Spiral	12,079	125	322,261	306 / 24	3/18/96 - 6/7/96
National 12th Grade Science Spiral	11,579	120	342,104	306 / 24	3/18/96 - 6/2/96
National 12th Grade Science Advanced	2,449	36	110,207	306 / 24	3/18/96 - 6/2/96

[1] This is the number of discrete constructed-response items in assessment booklets.

[2] This is the number of student responses to the constructed-response items. These scored responses include those that were rescored for reliability estimation.

[3] Because readers scored items from all grades and all types of booklets, it is not possible to break the numbers down by how many scored each classification of items.

Table 6-2

Student Participation and Session Information for the 1996 NAEP Assessment

	Number of Sessions	Number of Booklets for Assessed Students	Number of Booklets for Absent Students	Number of Booklets for Excluded Student	Number of Scanned Sheets
Long-Term Trend					
Fall	639	11,150	981	974	288,624
Winter	623	10,406	486	1,172	215,679
Spring	539	8,209	1,560	758	243,452
Main					
Grade 4 total	1,693	28,531	1,354	2,293	711,291
Mathematics	982	16,953	796	1,198	418,509
Science	711	11,578	558	1,095	292,782
Grade 8 total	1,698	32,339	2,359	1,823	922,892
Mathematics	819	17,992	1,338	1,062	509,064
Advanced Mathematics	345	2,375	94	4	73,268
Science	534	11,972	927	757	340,560
Grade 12 total	2,196	33,306	8,266	1,704	1,143,332
Mathematics	848	16,424	4,103	969	536,256
Advanced Mathematics	380	2,965	456	11	99,112
Science	613	11,486	3,332	715	387,504
Advanced Science	355	2,431	375	9	120,460
Other					
Rosters					23,535
Administration Schedules					24,575
Rescore Mathematics 1992 Grade 4					45,286
Rescore Mathematics 1992 Grade 8					61,311
Rescore Mathematics 1990					46,507

Table 6-3

Questionnaire Totals for the 1996 NAEP Assessment

	Expected	Received	Percent
Main Assessment			
Grade 4			
SD/LEP Questionnaire	5,116	4,885	95%
School Characteristics Questionnaire	597	577	97%
Grade 8			
SD/LEP Questionnaire	5,048	4,770	94%
School Characteristics Questionnaire	580	554	96%
Grade 12			
SD/LEP Questionnaire	4,147	3,806	92%
School Characteristics Questionnaire	582	546	94%
Long-Term Trend			
Fall			
Excluded Students Questionnaire	979	947	97%
School Characteristics Questionnaire	239	224	94%
Winter			
Excluded Students Questionnaire	1,187	1,145	96%
School Characteristics Questionnaire	247	235	95%
Spring			
Excluded Students Questionnaire	768	721	94%
School Characteristics Questionnaire	186	173	93%
Main Teacher Questionnaires			
Grade 4			
Mathematics/Science	1,599	1,609	101%
Grade 8			
Mathematics	1,401	1,359	97%
Science	1,310	1,270	97%
Grade 12			
Advanced Mathematics	476	487	102%

Table 6-4
NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
FALL LONG-TERM TREND				
Printing	6/15/95	9/19/95	6/15/95	9/19/95
Pre-packaging (barcoding, spiraling, and quality control)	8/14/95	9/7/95	8/14/95	9/7/95
Session file to NCS from Westat	8/25/95	8/25/95	8/25/95	8/25/95
Westat supervisor training	8/27/95	8/30/95	8/27/95	8/30/95
Print Administration Schedule	9/1/95	9/5/95	9/1/95	9/1/95
Supervisor add file from Westat	9/5/95	9/5/95	9/5/95	9/5/95
Final packing specifications to packaging	9/5/95	9/5/95	9/5/95	9/5/95
Packing list and labels to packaging	9/5/95	9/6/95	9/6/95	9/6/95
Grade 8 school characteristics and policies questionnaires arrive	9/7/95	9/7/95	9/7/95	9/19/95
Ship Administration Schedules	9/7/95	9/7/95	9/7/95	9/7/95
Information to Key Entry for screen set up	9/11/95	9/11/95	9/11/95	9/11/95
Bulk/session packaging	9/11/95	9/18/95	9/11/95	9/15/95
Packaging visit by ETS	9/13/95	9/14/95	9/14/95	9/14/95
Ship materials to supervisors	9/18/95	9/18/95	9/14/95	9/14/95
Materials due to supervisors	9/22/95	9/22/95	9/22/95	9/22/95
Processing specifications to Operations Department	10/2/95	10/2/95	10/2/95	10/2/95
Processing kick-off meeting	10/3/95	10/3/95	10/3/95	10/3/95
Requisitions for table leaders to HR	10/9/95	10/9/95	10/9/95	10/9/95
Requisitions for scorers to HR	10/9/95	10/9/95	10/9/95	10/9/95
Photocopy training materials	10/9/95	10/13/95	10/9/95	10/13/95
Test administration	10/9/95	12/19/95	10/10/95	12/19/95
Blue dot	10/10/95	10/20/95	10/20/95	10/20/95
Receiving	10/10/95	12/23/95	10/11/95	1/15/96
HR extends offer to table leaders	10/13/95	10/13/95	10/13/95	10/13/95
HR extends offers to scorers	10/16/95	10/16/95	10/16/95	10/16/95
General - Network Meeting	10/20/95	10/20/95	10/20/95	10/20/95
Processing	10/20/95	12/28/95	10/16/95	1/9/96
Scoring training preparation	10/9/95	11/17/95	10/9/95	10/17/95
Scoring training - writing	11/29/95	11/30/95	11/29/95	11/30/95
Scoring training - reading	12/4/95	12/5/95	12/4/95	12/5/95
Scoring reading/writing	11/29/95	1/5/96	11/29/95	1/5/96
Weights file shipped	1/12/96	1/15/96	1/15/96	1/15/96
Tape delivered	1/12/96	1/15/96	1/25/96	1/25/96
WINTER LONG-TERM TREND				
Printing	6/15/95	9/19/95	6/15/95	9/19/95
Pre-packaging (barcoding, spiraling)	9/29/95	10/10/95	9/6/95	9/14/95
Bundle sheets delivered to packaging	10/25/95	10/25/95	9/1/95	9/1/95
All bundles through clean quality control	11/3/95	11/3/95	9/1/95	9/1/95

(continued)

Table 6-4 (continued)

NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
WINTER LONG-TERM TREND (continued)				
Final packing specifications to packaging	11/17/95	11/17/95	11/16/95	11/16/95
HR extends offers to scorers	11/20/95	11/22/95	11/20/95	11/22/95
Session data file to NCS from Westat	11/22/95	11/22/95	11/22/95	11/22/95
Administration Schedule address file from Westat	11/28/95	11/28/95	11/22/95	11/22/95
Print Administration Schedules	12/1/95	12/1/95	11/30/95	11/30/95
Bulk/session address file from Westat	12/1/95	12/1/95	11/29/95	11/29/95
Ship Administration Schedules	12/4/95	12/4/95	12/1/95	12/1/95
Packing list and labels to packaging	12/4/95	12/5/95	12/1/95	12/1/95
Final packaging	12/6/95	12/8/95	12/6/95	12/7/95
Ship session materials	12/6/95	12/8/95	12/6/95	12/7/95
Processing specifications to Operations	12/18/95	12/18/95	12/18/95	12/18/95
Requisitions for scorers to HR	12/20/95	12/20/95	12/20/95	12/20/95
Materials due to supervisors	12/22/95	12/22/95	12/15/95	12/18/95
Test administration	1/3/96	3/15/96	1/2/96	3/15/96
Blue dot (s)	1/4/96	1/8/96	1/15/96	1/22/96
Receiving	1/4/96	3/20/96	1/9/96	3/20/96
Image definition ready	1/8/96	1/8/96	1/5/96	1/5/96
Processing	1/8/96	3/22/96	1/8/96	3/22/96
Photocopy training materials	1/9/96	1/12/96	1/9/95	10/13/95
Image test data ready	1/9/96	1/12/96	1/9/96	1/12/96
Image application ready	1/11/96	1/11/96	1/11/96	1/11/96
Scoring training preparation	1/29/96	1/31/96	1/29/96	1/29/96
Scoring training - writing	1/31/96	2/2/96	1/30/96	1/31/96
Scoring training - reading	1/31/96	2/2/96	2/6/96	2/6/96
Scoring reading/writing	2/5/96	4/5/96	2/7/96	4/2/96
Requisitions for mathematics scorers to HR	3/1/96	3/1/96	3/11/96	3/11/96
Scoring training - mathematics	3/25/96	3/25/96	3/25/96	3/25/96
Scoring - mathematics	3/25/96	4/5/96	3/25/96	3/29/96
Tape delivered	4/15/96	4/15/96	4/12/96	4/12/96
Weights file shipped	4/15/96	4/15/96	4/12/96	4/12/96
SPRING LONG-TERM TREND				
Printing	6/15/95	9/19/95	6/15/95	9/19/95
Pre-packaging (barcoding, spiraling)	7/21/95	9/25/95	7/21/95	9/25/95
HR extends offers to table leaders	10/13/95	10/13/95	10/13/95	10/13/95
HR extends offers to scorers	11/20/95	11/22/95	11/20/95	11/22/95
Session file to NCS from Westat	2/5/96	2/5/96	2/5/96	2/5/96
Bulk/session address file from Westat	2/8/96	2/8/96	2/5/96	2/5/96
Administration Schedule address file from Westat	2/8/96	2/8/96	2/7/96	2/7/96
Packing list and labels to packaging	2/8/96	2/8/96	2/9/96	2/9/96
Final packing specifications to packaging	2/8/96	2/8/96	2/12/96	2/12/96

(continued)

Table 6-4 (continued)

NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
SPRING LONG-TERM TREND (continued)				
Print Administration Schedules	2/12/96	2/12/96	2/9/96	2/9/96
Ship Administration Schedules	2/16/96	2/16/96	2/13/96	2/13/96
Package/ship session materials	2/23/96	2/23/96	2/23/96	2/23/96
Material due to supervisors	2/28/96	2/28/96	3/1/96	3/1/96
Processing specifications to Operations	3/8/96	3/8/96	3/8/96	3/8/96
Rescore booklets delivered to PSC	3/8/96	3/8/96	3/8/96	3/8/96
Photocopy training materials	3/9/96	3/12/96	10/9/95	10/13/95
Test administration	3/11/96	5/10/96	3/11/96	5/17/96
PSC approval of scoring sheets	3/15/96	3/15/96	3/13/96	3/13/96
Blue dot (s)	3/18/96	3/20/96	4/2/96	4/19/96
Processing	3/21/96	5/17/96	4/19/96	5/17/96
Requisitions for mathematics scorers to HR	4/1/96	4/1/96	4/1/96	4/1/96
Scoring training preparation	4/8/96	4/9/96	4/3/96	4/3/96
Scoring training - writing	4/10/96	4/11/96	4/10/96	4/11/96
Scoring reading/writing	4/10/96	5/24/96	4/11/96	4/11/96
Scoring training - reading	4/11/96	4/11/96	4/11/96	4/11/96
Scoring training - mathematics	5/13/96	5/13/96	5/13/96	5/13/96
Scoring mathematics	5/13/96	5/24/96	5/13/96	5/24/96
Project through clean post	5/17/96	5/17/96	5/17/96	5/17/96
Tape delivered	5/31/96	5/31/96	6/6/96	6/6/96
Weights file shipped	5/31/96	5/31/96	6/6/96	6/6/96
WRITING LONG-TERM TREND - HOLISTIC SCORING				
Requisition for scorers to HR	5/15/96	5/15/96	5/15/96	5/15/96
Requisition for table leaders to HR	5/15/96	5/15/96	5/15/96	5/15/96
PSC approves score sheet	5/15/96	5/15/96	5/15/96	5/15/96
HR makes offers to table leaders	5/20/96	5/31/96	5/28/96	6/4/96
HR makes offers to scorers	5/20/96	5/31/96	5/28/96	6/7/96
Samples drawn	5/24/96	5/24/96	5/20/96	5/24/96
Scoring preparation with J. Kennedy	6/4/96	6/7/96	6/5/96	6/7/96
Training and Scoring	6/10/96	6/14/96	6/10/96	6/16/96
Data tape delivered	7/1/96	7/1/96	6/27/96	6/27/96
WRITING LONG-TERM TREND - MECHANICS SCORING				
Requisition for scorers to HR	6/14/96	6/14/96	7/9/96	7/9/96
Requisition for table leaders to HR	6/14/96	6/14/96	7/9/96	7/9/96
HR makes offers to scorers	6/24/96	6/28/96	7/9/96	7/12/96
HR makes offers to table leaders	6/24/96	6/28/96	7/9/96	7/10/96
Samples drawn	6/24/96	6/24/96	6/24/96	6/24/96

(continued)

Table 6-4 (continued)
NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
WRITING LONG-TERM TREND - MECHANICS SCORING (continued)				
Responses copied for scoring	6/25/96	7/12/96	6/25/96	7/12/96
Training and scoring	7/15/96	7/26/96	7/15/96	7/31/96
Transcribe and proofread essays and scores	7/18/96	7/31/96	7/18/96	7/31/96
Data tape delivered	8/9/96	8/9/96	8/7/96	8/7/96
MAIN ASSESSMENT				
Printing	9/2/95	12/11/95	9/2/95	12/11/95
Administration Schedule approved	9/15/95	9/15/95	9/21/95	9/21/95
Pre-packing specifications to packaging	10/2/95	10/2/95	10/2/95	10/2/95
Grade 8 teacher questionnaire roster delivered to NCS	10/12/95	10/12/95	10/16/95	10/16/95
Grade 4 mathematics/science teacher questionnaire roster to NCS	10/12/95	10/12/95	10/17/95	10/17/95
PSC obtains copies of final blocks	10/16/95	10/16/95	10/16/95	10/16/95
Administration Schedule delivered to NCS	10/18/95	10/18/95	10/23/95	10/23/95
Grade 12 teacher questionnaire roster delivered to NCS	10/20/95	10/20/95	10/16/95	10/16/95
Grade 8 school characteristics and policies questionnaires at NCS	10/20/95	10/20/95	10/23/95	10/23/95
SD/LEP roster delivered to NCS	10/20/95	10/20/95	10/24/95	10/24/95
Grade 4 school characteristics and policies questionnaires at NCS	10/20/95	10/20/95	10/25/95	10/25/95
Grade 12 school characteristics and policies questionnaires at NCS	10/20/95	10/23/95	10/23/95	10/23/95
Grade 8 mathematics spiral material at NCS	10/23/95	11/2/95	10/18/95	11/3/95
Pre-packaging begins	10/23/95	12/20/95	10/16/95	12/1/95
Grade 4 mathematics spiral material at NCS	10/26/95	11/1/95	11/1/95	11/1/95
Grade 8 mathematics teacher questionnaire at NCS	10/30/95	10/30/95	10/25/95	10/25/95
Grade 8 science teacher questionnaire at NCS	10/30/95	10/30/95	11/1/95	11/1/95
Final valid score range for each item	11/1/95	11/1/95	10/24/95	11/17/95
PSC obtains rubrics from ETS	11/1/95	11/1/95	10/24/95	11/17/95
ETS/PSC define non-scorable codes	11/1/95	11/1/95	11/1/95	11/1/95
NCS/ETS meet to review items and schedule	11/2/95	11/3/95	11/2/95	11/3/95
Grade 4 mathematics/science teacher questionnaire delivered to NCS	11/3/95	11/3/95	11/2/95	11/2/95
Grade 8 science spiral material at NCS	11/6/95	11/13/95	11/13/95	11/21/95
Grade 12 mathematics spiral material at NCS	11/14/95	11/21/95	11/21/95	12/1/95
General - sub-contractor's meeting	11/16/95	11/17/95	11/16/95	11/17/95
SD/LEP questionnaire delivered to NCS	11/22/95	11/22/95	12/5/95	12/5/95
Grade 4 science spiral material at NCS	11/22/95	11/30/95	11/21/95	12/1/95

(continued)

Table 6-4 (continued)

NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
MAIN ASSESSMENT (continued)				
All materials at NCS for packaging	11/29/95	12/1/95	12/1/95	12/15/95
Grade 12 science spiral material at NCS	12/1/95	12/11/95	12/1/95	12/4/95
NCS receive 95% session data from Westat	12/4/95	12/4/95	12/6/95	12/6/95
Westat training for main supervisors	12/9/95	12/13/95	12/9/95	12/13/95
Westat send Administration Schedule home address file	12/11/95	12/11/95	12/11/95	12/11/95
Westat send NCS Wave 1 address file	12/11/95	12/11/95	12/11/95	12/11/95
Print Administration Schedule	12/11/95	12/13/95	12/13/95	12/13/95
WAVE 1 packing list and labels to packaging	12/13/95	12/13/95	12/14/95	12/14/95
Format/content Interrater Agreement Report	12/15/95	12/15/95	11/1/95	12/15/95
PSC obtains sample booklets	12/15/95	12/15/95	11/2/95	11/13/95
Purpose/use of T-Test and bridge reliability	12/15/95	12/15/95	11/2/95	11/3/95
PSC submit requisition for mathematics and science scorers	12/15/95	12/15/95	1/6/96	1/16/96
PSC submit requisition for mathematics and science team leaders	12/15/95	12/15/95	1/16/96	1/16/96
PSC submit requisition for mathematics and science table leaders	12/15/95	12/15/95	1/30/96	1/30/96
Ship Administration Schedule, teacher questionnaire, SD/LEP questionnaires, rosters	12/15/95	12/18/95	12/14/95	12/14/95
Ship bulk/Wave 1 material	12/20/95	12/20/95	12/15/95	12/18/95
Bulk/Wave 1 materials due to supervisors	12/26/95	12/26/95	12/26/95	12/29/95
Receiving	1/5/96	4/8/96	1/5/96	4/8/96
Test administration	1/3/96	4/5/96	1/3/96	4/5/96
Blue dot Grades 4, 8 and 12 mathematics	1/4/96	1/7/96	1/15/96	1/25/96
Blue dot Grades 4, 8, and 12 science	1/4/96	1/7/96	1/15/96	1/25/96
Blue dot advanced science	1/4/96	1/7/96	1/15/96	1/26/96
Blue dot Grade 12 estimation, theme, and advanced mathematics	1/4/96	1/7/96	1/15/96	1/31/96
Processing	1/8/96	4/14/96	1/25/96	4/29/96
Blue dot SD/LEP questionnaires	1/9/96	1/11/96	2/20/96	2/27/96
Assignments of mathematics items to teams	1/15/96	1/15/96	1/2/96	2/23/96
Scoring calendar item-by-item for mathematics	1/15/96	1/15/96	1/2/96	2/15/96
Wave 2 addresses from Westat	1/17/96	1/17/96	1/17/96	1/17/96
Packaging Wave 2 materials (2 shifts)	1/18/96	1/26/96	1/19/96	1/23/96
Wave 2 packing and mailing labels to packaging	1/17/96	1/19/96	1/19/96	1/19/96
Blue dot school characteristics and policies questionnaires and teacher questionnaires	1/22/96	1/25/96	2/9/96	2/26/96
Blue dot short-term rescore	1/25/96	1/25/96	3/5/96	3/11/96
Assignment of science items to teams	2/1/96	2/1/96	1/15/96	5/31/96

(continued)

Table 6-4 (continued)

NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
MAIN ASSESSMENT (continued)				
Mathematics and science table leaders hired	2/1/96	2/1/96	1/15/96	2/28/96
Plan for staff range finding	2/1/96	2/1/96	1/15/96	2/1/96
PSC selects science team leaders	2/1/96	2/1/96	1/15/96	1/16/96
PSC selects mathematics team leaders	2/1/96	2/1/96	1/16/96	1/16/96
Blue dot rosters (all types)	2/1/96	2/1/96	1/26/96	2/12/96
Wave 2 materials due to supervisors	2/2/96	2/2/96	2/1/96	2/2/96
Scoring calendar item by item (science)	2/3/96	2/6/96	1/15/96	5/31/96
Wave 3 addresses from Westat	2/7/96	2/7/96	2/7/96	2/7/96
Segment 1 day 25% scorers hired	2/12/96	2/12/96	2/7/96	2/7/96
Wave 3 packing list/mailing labels to packaging	2/12/96	2/12/96	2/9/96	2/13/96
Packaging/ship Wave 3 materials	2/12/96	2/19/96	2/19/96	2/20/96
Pre-range finding paper selection – mathematics	2/12/96	3/8/96	2/5/96	3/8/96
Pre-range finding paper selection – science	2/12/96	3/15/96	2/5/96	3/8/96
Segment 1 day 50% scorers hired	2/19/96	2/19/96	2/9/96	2/9/96
Segment 1 day 75% scorers hired	2/26/96	2/26/96	2/15/96	2/15/96
Wave 3 materials due in supervisors	2/26/96	2/26/96	2/26/96	2/27/96
PSC selects mathematics table leaders	3/1/96	3/1/96	2/1/96	2/28/96
PSC selects science table leaders	3/1/96	3/1/96	2/1/96	2/28/96
Segment 2 day 25% scorers hired	3/1/96	3/1/96	2/8/96	2/8/96
Segment 3 day 25% scorers hired	3/1/96	3/1/96	2/8/96	2/8/96
Segment 3 evening 25% scorers hired	3/1/96	3/1/96	2/20/96	2/20/96
Segment 2 evening 25% scorers hired	3/1/96	3/1/96	2/22/96	2/22/96
Segment 1 day 100% scorers hired	3/4/96	3/4/96	3/6/96	3/6/96
Table leaders for mathematics hired	3/8/96	3/8/96	2/1/96	3/22/96
Segment 3 day 50% scorers hired	3/8/96	3/8/96	2/14/96	2/14/96
Segment 2 day 50% scorers hired	3/8/96	3/8/96	2/15/96	2/15/96
Segment 2 evening 50% scorers hired	3/8/96	3/8/96	3/6/96	3/6/96
Segment 3 evening 50% scorers hired	3/8/96	3/8/96	3/6/96	3/6/96
Mathematics and science scorers assigned to teams	3/11/96	3/11/96	3/11/96	3/11/96
Train/score mathematics - Segment 1(day shift)	3/13/96	4/3/96	3/13/96	4/5/96
Segment 2 day 75% scorers hired	3/15/96	3/15/96	3/5/96	3/14/96
Segment 3 day 75% scorers hired	3/15/96	3/15/96	3/6/96	3/6/96
Segment 2 evening 75% scorers hired	3/15/96	3/15/96	3/14/96	3/14/96
Segment 3 evening 75% scorers hired	3/15/96	3/15/96	3/14/96	3/14/96
Train/score science - Segment 1 (day shift)	3/18/96	4/5/96	3/18/96	4/5/96
Segment 2 evening 100% scorers hired	3/22/96	3/22/96	3/25/96	3/25/96
Segment 3 evening 100% scorers hired	3/22/96	3/22/96	3/25/96	3/25/96
Segment 2 day 100% scorers hired	3/22/96	3/22/96	4/1/96	4/1/96
Segment 3 day 100% scorers hired	3/22/96	3/22/96	4/1/96	4/1/96
Table leaders for science hired	4/5/96	4/5/96	2/12/96	2/28/96

(continued)

Table 6-4 (continued)

NCS Schedule for the 1996 NAEP Assessment

Task	Planned Start	Planned Finish	Actual Start	Actual Finish
MAIN ASSESSMENT (continued)				
Train/score mathematics - Segment 2 (evening shift)	4/8/96	5/2/96	4/8/96	5/2/96
Train/score science - Segment 2 (evening shift)	4/8/96	5/2/96	4/8/96	5/2/96
Train/score mathematics - Segment 2 (day shift)	4/8/96	5/3/96	4/8/96	5/6/96
Train/score science - Segment 2 (day shift)	4/8/96	5/3/96	4/8/96	5/3/96
Mathematics through clean post	4/14/96	4/14/96	4/14/96	4/29/96
Science through clean post edit	4/28/96	4/28/96	4/26/96	4/26/96
Bilingual mathematics scoring	5/2/96	5/3/96	5/2/96	5/3/96
Grade 8 mathematics weights	5/4/96	5/6/96	5/3/96	5/3/96
Grade 4 mathematics weights	5/4/96	5/6/96	5/9/96	5/9/96
Grade 4 science data tape sent to ETS	5/31/96	5/31/96	5/30/96	5/30/96
School characteristics and policies questionnaires data tape shipped to ETS	7/11/96	7/12/96	7/11/96	7/11/96
Teacher questionnaire data tape shipped to ETS	7/18/96	7/19/96	7/19/96	7/24/96
SD/LEP questionnaire data shipped to ETS	7/26/96	7/29/96	8/2/96	8/2/96
Grade 12 science data tape sent to ETS	6/7/96	6/7/96	6/4/96	6/4/96
Grade 12 advanced science data tape sent to ETS	6/7/96	6/7/96	6/10/96	6/10/96
Grade 8 science data tape sent to ETS	5/31/96	5/31/96	6/26/96	6/26/96

6.1.1 Innovations for 1996

Much of the information necessary for documentation of accurate sampling and for calculating sampling weights is collected on the Administration Schedules that, until 1993, were painstakingly filled out by hand by Westat administrative personnel. In 1994, for the first time, much of the work was computerized—booklets were preassigned and booklet ID numbers were preprinted on the Administration Schedule. When Westat personnel received the documents, they filled in only the "exception" information. This new method also permitted computerized updating of information when the Administration Schedules were received at NCS, eliminating the need to sort and track thousands of pieces of paper through the processing stream.

The introduction of image processing and image scoring further enhanced the work of NAEP. Image processing and scoring were successfully piloted in a side-by-side study conducted during the 1993 NAEP field test, and so became the primary processing and scoring methods for the 1994 and 1996 assessments. Image processing allowed the automatic collection of handwritten demographic data from the administrative schedules and the student test booklet covers through intelligent character recognition (ICR). This service was a benefit to the jurisdictions participating in NAEP because they were able to write rather than grid certain information—a reduction of burden on the schools. Image processing also made image scoring possible, eliminating much of the time spent moving paper as part of the scoring process. The images of student responses to be scored were transmitted electronically to the scoring center, located at a separate facility from where the materials were processed. This process enhanced the reliability and monitoring of scoring and allowed both NCS and ETS to focus attention on the intellectual process of scoring student responses.

6.2 PRINTING

For the 1996 assessment, 255 unique documents were designed. NCS printed more than 1,900,000 booklets and forms, totaling over 58 million pages. Printing preparations began with the design of the booklet covers in June 1995. This was a collaborative effort involving staff from ETS, Westat and NCS. Since the goal was to design one format for use with all of the booklets, necessary data elements to be collected for the different assessment types had to be agreed upon. After various iterations, the cover design was finalized.

In a similar collaboration with ETS and Westat, NCS prepared administration schedules and questionnaire rosters. The camera-ready copies for these documents were created and edited using NCS Design Expert™ software.

Printing of the NAEP documents began with the documents for the long-term trend assessments. These included the 26 long-term trend assessment booklets, the Administration Schedule, the excluded student questionnaire, three school characteristics and policies questionnaires, and the roster of questionnaires. All materials for the long-term trend assessments were printed by September 19, 1995. The printing of assessment booklets, questionnaires and tracking forms for the main and state assessments followed. Printing of these documents was complete by December 11, 1995.

Details of the printing procedures are given in the *Report of Processing and Professional Scoring Activities* (National Computer Systems, 1996).

6.3 PACKAGING AND SHIPPING

The distribution effort for the 1996 NAEP assessment involved packaging and mailing documents and associated forms and materials to the Westat supervisors for the main and long-term trend assessments. The NAEP Materials Distribution System (MDS), initially developed by NCS in 1990 to control shipments to the schools and supervisors, was utilized again in 1996. Files in the MDS system contained the names and addresses for shipment of materials, scheduled assessment dates, and a listing of all materials available for use by a participant in a particular subject area. Changes to any of this information were made directly in the MDS file either manually or via file updates provided by Westat. Details of the accountability system and on-line bundle assignment and distribution system utilized for NAEP are given in the *Report of Processing and Professional Scoring Activities*.

The bar code technology introduced by NCS in the 1990 assessments continued to be utilized in document control. To identify each document, NCS utilized a unique ten-digit numbering system that consisted of the three-digit booklet number or form type, a six-digit sequential number, and a check digit. Each form was assigned a range of ID numbers. Bar codes reflecting this ID number were applied to the front cover of each document by NCS bar code processes and high-speed ink jet printers.

Once all booklets from a subject area were bar coded, they were spiraled and bundled into groups of 11 documents. For main samples in mathematics and science (done concurrently with the State Assessment samples in mathematics and science), NCS spiraled the booklets according to the pattern dictated by ETS in the bundle maps. Booklets were spiraled in such a manner that each booklet appeared in the first position in a bundle approximately the same number of times and the booklets were evenly distributed across the bundles. This assured that sample sizes of individual booklet types would not be jeopardized if entire bundles were not used. Since the mathematics and science estimation and advanced booklet bundles contained only one booklet type, these were bundled into groups of 11. The mathematics bilingual booklets were bundled in groups of three.

Initially 5,161 individual sessions were shipped for the 1996 NAEP assessments. Approximately 600 additional shipments of booklets and miscellaneous materials were sent. All outbound shipments were recorded in the NCS Outbound Mail Management system. This was accomplished by having a bar code containing the school number on each address label. This bar code was read into the system, which determined the routing of the shipment and the charges. Information was recorded in a file on the system which, at the end of each day, was transferred by a PC upload to the mainframe. A computer program could then access information to produce reports on all shipments sent, regardless of the carrier used. These reports helped NCS phone staff trace shipments for Westat supervisors and assessment administrators.

A toll-free telephone line was maintained for supervisors and school administrators to request additional materials for the National assessments. To process a shipment, NCS phone staff asked the caller for information such as primary sampling unit (PSU), school ID, assessment type, city, state, and ZIP code. This information was then entered into the on-line short shipment system and the school's mailing address would be displayed on the screen to verify with the caller. The system allowed NCS staff to change the shipping address for individual requests. The clerk proceeded to the next screen that displayed the materials to be selected. After the requested items, due date and method of shipment were entered, the system produced a packing list and mailing labels. Phone staff also took phone calls concerning initial shipment delivery dates, tracing a shipment, and questions concerning NAEP. Approximately 750 calls were received regarding the 1996 NAEP assessments.

Further information regarding packaging and shipping is provided in the *Report of Processing and Professional Scoring Activities* (National Computer Systems, 1996).

6.4 PROCESSING

6.4.1 Overview

The following describes the various stages of work involved in receiving and processing the documents used in the 1996 assessment. NCS staff created a set of predetermined rules and specifications for the processing departments within NCS to follow. Project staff performed a variety of procedures on materials received from the assessment administrators before releasing these materials into the NCS NAEP processing system. Control systems were used to monitor all NAEP materials returned from the field. The NAEP Process Control System (PCS) contained the status of sampled schools for all sessions and their scheduled assessment dates. As materials were returned, the PCS was updated to indicate receipt dates, to record counts of materials returned, and to document any problems discovered in the shipments. As documents were processed, the system was updated to reflect processed counts. NCS report programs were utilized to allow ETS, Westat, and NCS staff to monitor the progress in the receipt control operations.

An "alert" process was used to record, monitor, and categorize all discrepant or problematic situations. Throughout the processing cycle, alert situations were either flagged by computer programs or identified during clerical check-in procedures. Certain alerts, such as missing demographic information on the administration schedule, were resolved by opening staff retrieving the information from booklet covers. These alerts, known as "Information Alerts," were recorded directly into the PCS system by opening personnel, eliminating the need for paper documentation. Since these problem situations were categorized and tallied as they were key-entered into the PCS system, project staff were able to provide timely reporting on clerical-type errors made during test administration. Alert situations that could not be resolved by opening personnel were described on alert forms that were forwarded to project personnel for resolution. Once resolved, the problems and resolutions were recorded online in the PCS system.

NCS's Work Flow Management System was used to track batches of student booklets through each processing step, allowing project staff to monitor the status of all work in progress. It was also used by NCS to analyze the current work load, by project, across all work stations. By routinely monitoring these data, NCS's management staff was able to assign priorities to various components of the work and to monitor all phases of the data receipt and processing.

6.4.2 Document Receipt

Shipments were to be returned to NCS packaged in their original boxes. As mentioned earlier, NCS packaging staff applied a bar code label to each box indicating the NAEP school ID number. When a shipment arrived at the NCS dock area, this bar code was scanned into a personal computer file, and the shipment was forwarded to the receiving area. The file was then transferred to the mainframe and the shipment receipt date was applied to the appropriate school within the PCS system, providing the status of receipts regardless of any processing delays. Each receipt was reflected on the PCS status report provided to the NCS receiving department and supplied to Westat via electronic file transfer and in hard-copy format. ETS also received a hard copy.

The PCS file could be manually updated to reflect changes. Receiving personnel also checked the shipment to verify that the contents of the box matched the school and session indicated on the label. Each shipment was checked for completeness and accuracy. Any shipment not received within two days of the scheduled assessment date was flagged in the PCS system and annotated on the PCS report. The administration status of these delayed shipments was checked and in some cases a trace was initiated on the shipment.

A new requirement for NCS was to open all shipments within forty-eight hours of their receipt and to key-enter preliminary processing information into the PCS system from the Administration Schedule. The preliminary information was written on the Administration Schedule by Westat assessment administrators and consisted of the following:

- School number
- Session number
- Original test date
- Total number assessed

This preliminary information, used to provide Westat with timely student response rates, was updated with actual data when materials passed through processing error free. A completeness flag was also applied to the PCS file by NCS opening staff if any part of the shipment was missing.

If multiple sessions were returned in one box, the contents of the package were separated by session. The shipment was checked to verify that all booklets preprinted or handwritten on the Administration Schedule were returned with the shipment and that all administration codes matched from booklet cover to the Administration Schedule. If discrepancies were discovered at any step in this process, the receiving staff issued an alert to facilitate tracking. If the administrator indicated that a make-up session was being held the documents were placed on holding carts until the make-up session documents arrived. If no make-up session was indicated, Westat was contacted for the status of the missing materials. If the missing materials were to be returned, the documents already received were held until that time. If the materials were not being returned, processing continued and the appropriate administration code was applied to the Administration Schedule.

6.4.3 Batching and Scanning Documents

Once all booklets listed on the Administration Schedule for a session were verified as present, the entire session (both the Administration Schedule and booklets) was batched by grade level and session type. Each batch was assigned a unique batch number. This number, created on the Image Capture Environment system for all image-scannable documents and on the Work Flow Management system for all key-entry and OMR-scannable documents[2], facilitated the internal tracking of the batches and allowed departmental resource planning. All other scannable documents (School Characteristics and Policies Questionnaires, Teacher Questionnaires, Students with Disabilities/Limited English Proficiency [SD/LEP] Questionnaires, and rosters) were batched by document type in the same manner.

Because all assessment booklets were image-scannable, batch numbers for these documents were created on the Image Capture Environment system. Sessions were sorted by grade level and automatically uploaded to the Work Flow Management system after batch creation. The Administration Schedule for these document types was used as a session header within a batch.

When batching mathematics documents, NCS needed to allow for having both image-scannable and key-entry documents present in the same session, or having booklets listed on the Administration Schedule that would not be present in processing. This was due to the testing accommodations of large-print and Braille that were key-entry documents.

Large-print booklets had to be processed separately from the Administration Schedule and scannable booklets in their session. A key-entry session header was created for these booklets that contained the school ID number and session code from the Administration Schedule. Long-term trend reading/writing booklets were processed through key-entry with the same type of key-entry session header. The Administration Schedules from reading/writing sessions were processed in an Administration-Schedule-only batch through the image scanning system. After the session that a large-print booklet came with passed through image processing, session information was rejoined within the processing computer programs. The same computerized match occurred with Trend reading/writing materials once the Administration-Schedule-Only batch that contained a session's administration schedule passed through processing.

6.4.4 Questionnaires

The long-term trend assessments used one roster to account for all questionnaires. The roster of questionnaires recorded the distribution and return of the School Characteristics and Policies Questionnaires and the Excluded Student Questionnaires.

The main assessments utilized one roster to document and track the School Characteristics and Policies Questionnaires and the Students with Disabilities/Limited English Proficiency (SD/LEP) Questionnaire. In addition, the main and state assessments used the roster of Teacher Questionnaires to record the distribution and return of Teacher Questionnaires.

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[2] OMR is the acronym for Optical Mark Reading.

Some questionnaires may not have been available for return with the shipment. These were returned to NCS at a later date in an envelope provided for that purpose. The questionnaires were submitted for scanning as sufficient quantities became available for batching.

Receipt of the questionnaires was entered into the system using the same process as was used for the Administration Schedules described in previous sections. The rosters were grouped with other rosters of the same type from other sessions, and a batch was created on the Image Capture Environment system. The batch was then forwarded to scanning where all information on the rosters was scanned into the system.

6.4.5 Booklet Accountability

NCS used a sophisticated booklet accountability system to track all distributed booklets. Prior to the distribution of NAEP materials, unique booklet numbers were read by bundle into a file. Specific bundles were then assigned to particular supervisors or schools. This assignment was recorded in the NAEP Materials Distribution System.

When shipments arrived at NCS from the field, all used booklets were submitted for processing and a "processed documents" file was maintained. Unused booklets were submitted for security scanning where booklet ID bar codes were read and recorded into a separate file. This file and the "processed documents" file were later compared to the original bundle security file for individual booklet matching. A list of unmatched booklet IDs was printed in a report used to confirm non-receipt of individual booklets. At the end of the assessment period, supervisors returned all unused materials. These booklet IDs were also read by the bar-code scanner and added to the bundle security file. All unused materials received were then inventoried and sent to the NCS warehouse for storage while awaiting authorization from ETS to salvage them.

6.4.6 Data Entry

The data entry process was the first point at which booklet-level data were directly available to the computer system. Depending on the NAEP document, one of three methods was used to transcribe NAEP data to a computerized form. The data on scannable documents were collected using NCS optical-scanning equipment that also captured images of the constructed-response items and ICR fields. Nonscannable materials were keyed through an interactive online system. In both of these cases, the data were edited and suspect cases were resolved before further processing.

All student booklets, questionnaires, and control documents were scannable. Throughout all phases of processing, the student booklets were batched by grade and session type. The scannable documents were then transported to a slitting area where the folded and stapled spine was removed from the document. This process utilized an "intelligent slitter" to prevent slitting the wrong side of the document. The documents were jogged by machine so that the registration edges of the NAEP documents were smoothly aligned, and the stacks were then returned to the cart to be scanned.

During the scanning process, each scannable NAEP document was uniquely identified using a print-after-scan number consisting of the scan batch number, the sequential number within the batch, and the bar code ID of the booklet. These numbers were printed on each sheet of each document as it exited the scanner. This permitted the data editors to quickly and accurately locate specific documents during the editing phase. The print-after-scan number remained with the data record, providing a method for easy identification and quick retrieval of any document.

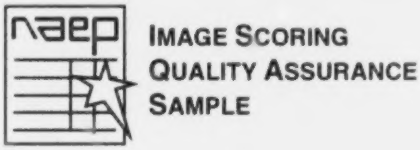
The data values were captured from the booklet covers and Administration Schedules and were coded as numeric data. Unmarked fields were coded as blanks and editing staff were alerted to missing or uncoded critical data. Fields that had multiple marks were coded as asterisks (*). The data values for the item responses and scores were returned as numeric codes. The multiple-choice single response format items were assigned codes depending on the position of the response alternative; that is, the first choice was assigned the code "1," the second "2," and so forth. The mark-all-that-apply items were given as many data fields as response alternatives; the marked choices were coded as "1" while the unmarked choices were recorded as blanks. The images of constructed-response items were saved as a digitized computer file. The area of the page that needed to be clipped was defined prior to scanning through the document definition process. The fields from unreadable pages were coded "X" as a flag for resolution staff to correct. In addition to capturing the student responses, the bar code identification numbers used to maintain process control were decoded and transcribed to the NAEP computerized data file.

As the scanning program completed scanning each stack, the stack was removed from the output hopper and placed in the same order they were scanned on the output cart. The next stack was removed from the input cart and placed into the input hopper, after which the scanning resumed. When the operator had completed processing the last stack of the batch, the program was terminated. This closed the dataset that automatically became available for the data validation (edit) process. The scanned documents were then forwarded to a holding area in case they needed to be retrieved for resolution of edit errors.

NCS again used the ICR engine to read various hand and machine printing on the front cover of the assessment and supervisor documents for the 1996 NAEP assessments. Some information from scannable student documents, such as the Administration Schedule, the roster of questionnaires, and some questions in the School Characteristics and Policies Questionnaires, were read by the ICR engine and verified by an online key-entry operator. In all, the ICR engine read approximately 15 million characters. The ICR engine saved NAEP field staff and school personnel a significant amount of time because they no longer had to enter these data by gridding rows and columns of data.

NCS also implemented new programs that allowed the scanners to read imprinted codes, known as 2-out-of-5 codes, that were printed via a Xerox 4280 printer on the Administration Schedule. These 2-out-of-5 codes were imprinted at the same time the booklet ID numbers were printed on the Administration Schedule and identified which booklet IDs were listed on that document. When the scanning programs were unable to translate the 2-out-of-5 codes (thereby identifying the booklet ID numbers on the document) image clips of the booklet ID numbers were displayed to online editing staff for verification. This eliminated a significant amount of online editing time needed to process the NAEP assessments.

To provide another quality check on the image scanning and scoring system, NCS staff stamped blank booklets with a rubber stamp and assigned these booklets mock scores from the valid range. Each unique item type scored via the image system had two quality control stamps per valid score. An example of the stamp used is given below.



The quality control booklets were batched and processed together with student documents of the same type. Because all of a specific item were batched together for transmission to the scoring facility, the quality control-stamped responses were integrated with the student responses and transmitted simultaneously to the scoring facility. During the scoring process, both student responses and the quality control items were randomly displayed so scores could be applied.

When a person who was scoring responses (reader) later saw the quality control sample on the monitor during scoring, he or she was to notify the team leader, who confirmed the score assigned by the reader was the score listed on the sample. The quality control booklets were included in the pool of all items to be drawn from for the 25 percent reliability rescore.

All image quality-assurance documents were created prior to the beginning of scoring and all pre-determined score points were used. Because during the process of scoring, valid score points can be changed or dropped completely, NCS provided ETS with documentation explaining what quality control documents were produced and which score points on these items were no longer valid. When an image quality control stamp was displayed to a reader that contained a score point that was no longer valid, the reader gave the response a score point of zero.

A process of key entry and verification was used to make corrections to the non-scannable long-term trend reading/writing documents and large print booklets. Teacher questionnaire and SD/LEP questionnaire information was also corrected using key-entry methods. NCS used the Falcon system to enter this data. The Falcon system is an on-line data-entry system designed to replace most methods of data input such as keypunch, key-to-disk, and many of the microcomputer data-entry systems. The terminal screens were designed to enhance operator speed and convenience. The fields to be entered were titled to reflect the actual source document. Therefore, all key-entry fields were specific to the NAEP student documents or questionnaire types being keyed.

6.4.7 Data Validation

Each dataset produced by the scanning system contained data for a particular batch. These data had to be validated (or edited) for type and range of response. The data-entry and resolution system used was able to simultaneously process a variety of materials from all age groups, subject areas, control documents, and questionnaires as the materials were submitted to the system from scannable and non-scannable media.

The data records in the scan file were organized in the same order in which the paper materials were processed by the scanner. A record for each batch header preceded all data records for that batch. The document code field on each record distinguished the header record from the data records.

When a batch-header record was read, a pre-edit data file and an edit log were generated. As the program processed each record within a batch from the scan file, it wrote the edited and reformatted data records to the pre-edit file and recorded all errors on the edit log. The data fields on an edit log record identified each data problem by the batch sequence number, booklet serial number, section or block code, field name or item number, and data value. After each batch had been processed, the program generated a listing or online edit file of the data problems and resolution guidelines. An edit log listing was printed at the termination of the program for all non-image documents. Image "clips" requiring editing were routed to online editing stations for those documents that were image scanned.

As the program processed each data record, it first read the booklet number and checked it against the session code for appropriate session type. Any mismatch was recorded on the error log and processing continued. The booklet number was then compared against the first three digits of the student identification number. If they did not match, a message was written on the error log. The remaining booklet cover fields were read and validated for the correct range of values. The school codes had to be identical to those on the PCS record. All data values that were out of range were read "as is" but were flagged as suspect. All data fields that were read as asterisks (*) were recorded on the edit log or online edit file.

Document definition files described each document as a series of blocks that in turn were described as a series of items. The blocks in a document were transcribed in the order that they appeared in the document. Each block's fields were validated during this process. If a document contained suspect fields, the cover information was recorded on the edit log along with a description of the suspect data. The edited booklet cover was transferred to an output buffer area within the program. As the program processed each block of data from the dataset record, it appended the edited data fields to the data already in this buffer.

The program then cycled through the data area corresponding to the item blocks. The task of translating, validating, and reporting errors for each data field in each block was performed by a routine that required only the block identification code and the string of input data. This routine had access to a block definition file that had, for each block, the number of fields to be processed, and, for each field, the field type (alphabetic or numeric), the field width in the data record, and the valid range of values. The routine then processed each field in sequence order, performing the necessary translation, validation, and reporting tasks.

The first of these tasks checked for the presence of blanks or asterisks (*) in a critical field. These were recorded on the edit log or online edit file and processing continued with the next field. No action was taken on blank fields for multiple-choice items because the asterisk code indicated a non-response. The field was validated for range of response, and any values outside of the specified range were recorded on the edit log or online edit file. The program used the item-type code to make a further distinction among constructed-response item scores and other numeric data fields.

Moving the translated and edited data field into the output buffer was the last task performed in this phase of processing. When the entire document was processed, the completed string of data was written to the data file. When the program encountered the end of a file, it closed the dataset and generated an edit listing for non-image and key-entered documents. Image-scanned items that required correction were displayed at an online editing terminal.

6.4.8 Editing for Non-Image and Key-Entered Documents

Throughout the system, quality procedures and software ensured that the NAEP data were correct. All student documents on the Administration Schedule were accounted for, as receipt control personnel checked that the materials were undamaged and assembled correctly. The machine edits performed during data capture verified that each sheet of each document was present and that each field had an appropriate value. All batches entered into the system, whether key-entered or machine-scanned, were edited for errors.

Data editing took place after these checks. This consisted of a computerized edit review of each respondent's document and the clerical edits necessary to make corrections based upon the computer edit. This data-editing step was repeated until all data were correct.

The first phase of data editing was designed to validate the population and ensure that all documents were present. A computerized edit list, produced after NAEP documents were scanned or key entered, and all the supporting documentation sent from the field were used to perform the edit function. The hard-copy edit list contained all the vital statistics about the batch: number of students, school code, type of document, assessment code, suspect cases, and record serial numbers. Using these inputs, the data editor verified that the batch had been assembled correctly and that each school number was correct.

During data entry, counts of processed documents were generated by type. These counts were compared against the information captured from the Administration Schedules. The number of assessed and absent students processed had to match the numbers indicated on the PCS.

In the second phase of data editing, experienced editing staff used a predetermined set of specifications to review the field errors and record necessary corrections to the student data file. The same computerized edit list used in phase one was used to perform this function. The editing staff reviewed the computer-generated edit log and the area of the source document that was noted as being suspect or as containing possible errors. The composition of the field was shown in the edit box. The editing staff checked this piece of information against the NAEP source document. At that point, one of the following took place:

> *Correctable error.* If the error was correctable by the editing staff as per the editing specifications, the correction was noted on the edit log for later correction via key-entry.
>
> *Alert.* If an error was not correctable as per the specifications, an alert was issued to NAEP project staff for resolution. Once the correct information was obtained, the correction was noted on the edit log for key-entry correction.
>
> *Non-correctable error.* If a suspected error was found to be correct as stated and no alteration was possible according to the source document and specifications, the programs were tailored to allow this information to be accepted into the data record. No corrective action was taken.

The corrected edit log was then forwarded to the key-entry staff for processing. When all corrections were entered and verified for a batch, an extract program pulled the corrected records into a mainframe dataset. At this point, the mainframe edit program was initiated. The edit criteria were again applied to all records. If there were further errors, a new edit listing was printed and the cycle was repeated.

When the edit process produced an error-free file, the booklet ID number was posted to the NAEP tracking file by age, assessment, and school. This permitted NCS staff to monitor the NAEP processing effort by accurately measuring the number of documents processed by form. The posting of booklet IDs also ensured that a booklet ID was not processed more than once.

6.4.9 Data Validation and Editing of Image-Processed Documents

The paper edit log for key-entered documents was replaced by online viewing of suspect data for all image-processed documents. For rapid resolution, the edit criteria for each item in question appeared on the screen along with the suspect item. Corrections were made immediately. The system employed an edit/verify system that ultimately meant that two different people viewed the same suspect data and operated on it separately. The "verifier" made sure the two responses (one from either the entry operator or the ICR engine) were the same before the system accepted that item as being correct. The verifiers could either overrule or agree with the original correction made if the two did not match. If the editor could not determine the appropriate response, he or she escalated the suspect situation to a supervisor. For errors or suspect information that could not be resolved by supervisory staff, a product-line queue was created. This allowed supervisors to escalate edits to project staff for resolution. By having this product-line queue, project staff were able to quickly locate edit clips within the image system, speeding up the resolution process.

Once an entire batch was through the edit phase, it became eligible for the count-verification phase. The Administration Schedule data were examined systematically for booklet IDs that should have been processed (assessed administration codes). All documents under that Administration Schedule were then inspected to ensure that all of the booklets were included.

With the satisfactory conclusion of the count-verification phase, the edited batch file was uploaded to the mainframe, where it went through yet another edit process. A paper edit log was produced and, if errors remained, was forwarded to another editor. When this paper edit was satisfied, the PCS and Workflow Management system were updated. Because there was a possible time lag between a clean edit in the image system and a clean edit in the mainframe systems, the batch was not archived until 48 hours after the image edit phase was completed.

6.4.10 Data Transmission

Due to the rapid pace of scoring on an item-by-item basis, the NCS scoring specialists found it necessary to continually monitor the status of work available to the readers and plan the scoring schedule several weeks in advance. On Wednesday of each week, the NCS performance assessment specialist in charge of each subject area planned the next two weeks' schedule. That information was then provided to the person in charge of downloading data to the scoring center. By planning the scoring schedule two weeks in advance, the scoring specialists were able to ensure that readers would have sufficient work for at least one week, after which the next download would occur to supplement the volume of any unscored items and add an additional week's work to the pool of items to score. Additionally, by scheduling two weeks' data transmission, flexibility was added to the scoring schedule, making it possible to implement last-minute changes in the schedule once the items had been delivered to the scoring center. Depending on the number of items to be transmitted, the actual downloading was conducted on Friday or was divided into two smaller sessions for Thursday and Friday download. By the first week of May 1996, there was sufficient space on the scoring servers to load all remaining unscored items to the scoring center.

Delivery of data to the scoring center was accomplished via several T1 transmission lines linking the mainframe computers and the NAEP servers at the document-scanning site in the NCS main facility with the scoring servers dedicated to distributing work to the professional readers at the scoring center. The actual task of scheduling items for downloading was accomplished using a code written by the Image Software Development team. This code enabled the person scheduling the download to choose a team of readers and select the scheduled items from a list of all items that that team would be scoring throughout the scoring project. This process was repeated for all teams of readers until all anticipated work was scheduled. Once this task was completed, the scheduled job was tested to determine if there was sufficient free disk space on the servers at the scoring center. If for any reason sufficient disk space was not available, scheduled items could be deleted from the batch individually or as a group until the scheduled batch job could accommodate all items on the available disk space at the scoring center. Once it was determined that sufficient disk space was available, transmission of student responses commenced. Data transmission was typically accomplished during off-shift hours to minimize the impact on system-load capacity.

6.5 DATA DELIVERY

The 1996 NAEP data collection resulted in several classes of data files — student, school, teacher, weights, SD/LEP student, excluded student questionnaire data for long-term trends, student/teacher match, and student-response information. Student-response information included response data from all assessed students in 1996. Data resolution activities occurred prior to the submission of data files to ETS and Westat to resolve any irregularities that existed. This section details additional steps performed before creating the final data files to ensure capture of the most complete and accurate information.

An important quality-control component of the image-scoring system was the inclusion, for purposes of file identification, of an exact copy of the student edit record, including the student booklet ID number, with every image of a student's response to a constructed-response item. These edit files also remained in the main data files residing on the NCS mainframe computer. By doing this, exact matching of scores assigned to constructed-response items and all other data for each individual student was guaranteed, since the booklet ID for each image was part of every image file. This ensured scores were applied to the correct student's record on the mainframe.

When all of the responses for an individual item had been scored, the system automatically submitted all item scores assigned during scoring, along with their edit records, to a queue to be transmitted to the mainframe. Project staff then initiated a system job to transmit all scoring data to be matched with the original student records on the mainframe. A custom edit program matched the edit records of the scoring files to those of the original edit records on the mainframe. As matches were confirmed, the scores were applied to those individual files. After completion of this stage, all data collected for an individual student was located in one single and complete record/file identified by the edit record.

NCS processed the SD/LEP student questionnaires via OMR scanning. Edits performed on the questionnaires assured that responses to questions fell within the valid range for that question. SD/LEP questionnaires were then matched to a student record. SD/LEP Questionnaires that were not matched to a student document were cross-referenced with the corresponding Administration Schedule, roster of questionnaires, and student data files to correct, if necessary, the information needed to result in a match.

In 1996, NCS continued to use ICR technology to capture percentage figures written by school personnel directly in boxes on the school characteristics and policies questionnaires rather than requiring the school official to grid ovals in a matrix. The data were then verified by an edit operator.

To achieve the best possible student/teacher match rate, the same processes that were followed in previous cycles were used in 1996. The first step was to identify teacher questionnaires not returned to NCS for processing so as to exclude from the matching process the students of these teachers. Student identification numbers that were not matched to a teacher questionnaire were cross-referenced with the corresponding Administration Schedule and roster of teacher questionnaires to verify (and change, if necessary) the teacher number, teacher period, and questionnaire number recorded on these control documents. The NAEP school numbers listed on the roster of questionnaires and teacher questionnaire were verified and corrected, if necessary. Once these changes were made, any duplicate teacher numbers existing within a school were, if possible, cross-referenced for resolution with the roster of questionnaires. Since this information was located together on a single, central control document, the ability to match and resolve discrepant or missing fields was simplified.

After all data-processing activities were completed, data cartridges and/or diskettes were created and shipped via overnight delivery to ETS and/or Westat. A duplicate archive file is maintained at NCS for security and backup purposes.

6.6 MISCELLANEOUS

6.6.1 Storage of Documents

After batches of image-scanned documents had successfully passed the editing process, they were sent to the NCS warehouse for storage. The long-term trend reading/writing booklets were sent to the NCS scoring center to be scored on paper and to be used for holistic and mechanics scoring. After all scoring had been completed for the long-term trend booklets, they were also sent to the warehouse for storage. Due to the large number of rescore projects done with NAEP material, the documents were unspiraled and sequenced by grade and booklet type after all of the processing/scoring was completed. This will allow for efficient document retrieval to fill requests for specific booklet types for future scoring projects. Unspiraled and sequenced booklets were then assigned a new inventory number by grade and booklet type and sent back to the warehouse for storage. The storage locations of all documents were recorded on the inventory control system. Unused materials were sent to temporary storage to await completion of the entire assessment. Once the assessment was complete, NCS received authorization from ETS to salvage unused materials after determining that a sufficient quantity of each form type was retained in permanent archive.

6.6.2 Quality-Control Documents

ETS requires that a random sample of booklets and the corresponding scores/scoring sheets be pulled for an additional quality-control check. For image-scanned documents, a scoring sheet is not used, so ETS uses scores sent to them on a data tape to verify the accuracy of applied scores. During the scoring of mathematics, a selected number of image-processed booklets were paper scored. If any of the random sample of mathematics booklets used for paper scoring were selected as quality-control documents, the scoring sheet was also sent to ETS. For non-scannable trend reading/writing booklets and for the trend mathematics/science booklets that were scored via paper, both the booklet and its corresponding score sheet were sent. All of these documents were selected prior to sending the booklets to storage and were then sent to ETS to verify the accuracy and completeness of the data. A random sample of all the questionnaires used in the 1996 NAEP assessment was also sent to ETS.

6.6.3 Alert Analysis

Table 6-5 identifies the different types of alerts to problems that were encountered in the processing of NAEP data. For the 1996 main and long-term trend assessments, there was a total of 230 alerts; for the State Assessment, there was a total of 3,812 alerts.

Discrepancies were found in the receiving process that did not require an alert to be issued to Westat. They did require a great deal of effort by the opening staff to resolve in order to provide the most complete and accurate information. These are referred to as "info alerts." These were categorized and codes were assigned to them. They are listed in the left-hand column of Table 6-5.

Even though receipt-control staff were well trained in the resolution of many situations, there were some problems that required resolution by NCS NAEP product line staff. These are referred to as "problem alerts." The various types of problem alerts were also categorized and coded. They are listed in the right-hand column of Table 6-5. For any unusual situations, Westat was contacted to help with the resolution of the alert.

Table 6-5

Alerts for the 1996 National and State Assessments

Information Alerts	Problem Alerts
Code 52 not written on Administration Schedules	Change of Administration Codes-A/S or Booklets
The yes/no box not gridded on Rosters	Incorrect Rosters/Questionnaires
Session Number not on Administration Schedules	Administration Notes/Writing on Covers
Administration Codes not on A/S; but on booklets	Duplicate Student / Booklet Number/ Administration Schedule
Administration Codes not on booklets; but on A/S	All material not returned
Items returned for Westat	Affected Testing - Problem
Writing on booklet covers	Transcribed page(s) for student booklet(s)
Other	Processed as is
	Involves Inclusion Check List
	Other

A/S = Administration Schedules

Chapter 7

PROFESSIONAL SCORING[1]

Patrick B. Bourgeacq, Bradley Thayer, and Timothy Robinson
National Computer Systems

7.1 INTRODUCTION

The 1996 national assessment required the scoring of constructed responses in mathematics and science at grades 4, 8, and 12. Long-term trend assessments for 9-, 13-, and 17-year-olds in reading, writing, mathematics and science continued at levels comparable to previous assessment years. In all, over nine million constructed responses for the 1996 national and state assessments were scored.

More than 300 professional readers split between a full-time day shift and part-time evening shift were hired for scoring. Veteran scorers were mixed with new hires screened for their ability to score constructed responses, providing the scoring center with excellent groups of qualified readers. Regular full-time staff, with the help of administrative assistants, bridged the shifts to ensure quality scoring between the two groups. For the first time in a National Assessment of Educational Progress (NAEP) assessment, National Computer Systems (NCS) provided a significant number of trainers who worked with Educational Testing Service (ETS) staff to train teams of scorers on many items. Also, NCS used lead scorers for the first time in a NAEP assessment to assist the table leaders with administrative duties and monitoring quality of scoring. The help of lead scorers made it possible to score greater volumes of responses with teams as large as 14 scorers without any apparent compromises in the quality of scoring.

As in previous years, the image system distributed responses among teams who scored them in an efficient manner to maximize consistency and reliability. The system also provided enhanced tools to display images, gather data, and monitor the quantity and quality of work.

The figures and tables on the following pages summarize the scope of professional scoring for the 1996 NAEP.

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[1] Bradley Thayer was the NCS project manager for 1996 NAEP, Patrick Bourgeacq was the NCS project director for 1996 NAEP scoring, and Timothy Robinson was the NCS senior processing coordinator for 1996 NAEP.

Figure 7-1

Image Scoring Flow Chart

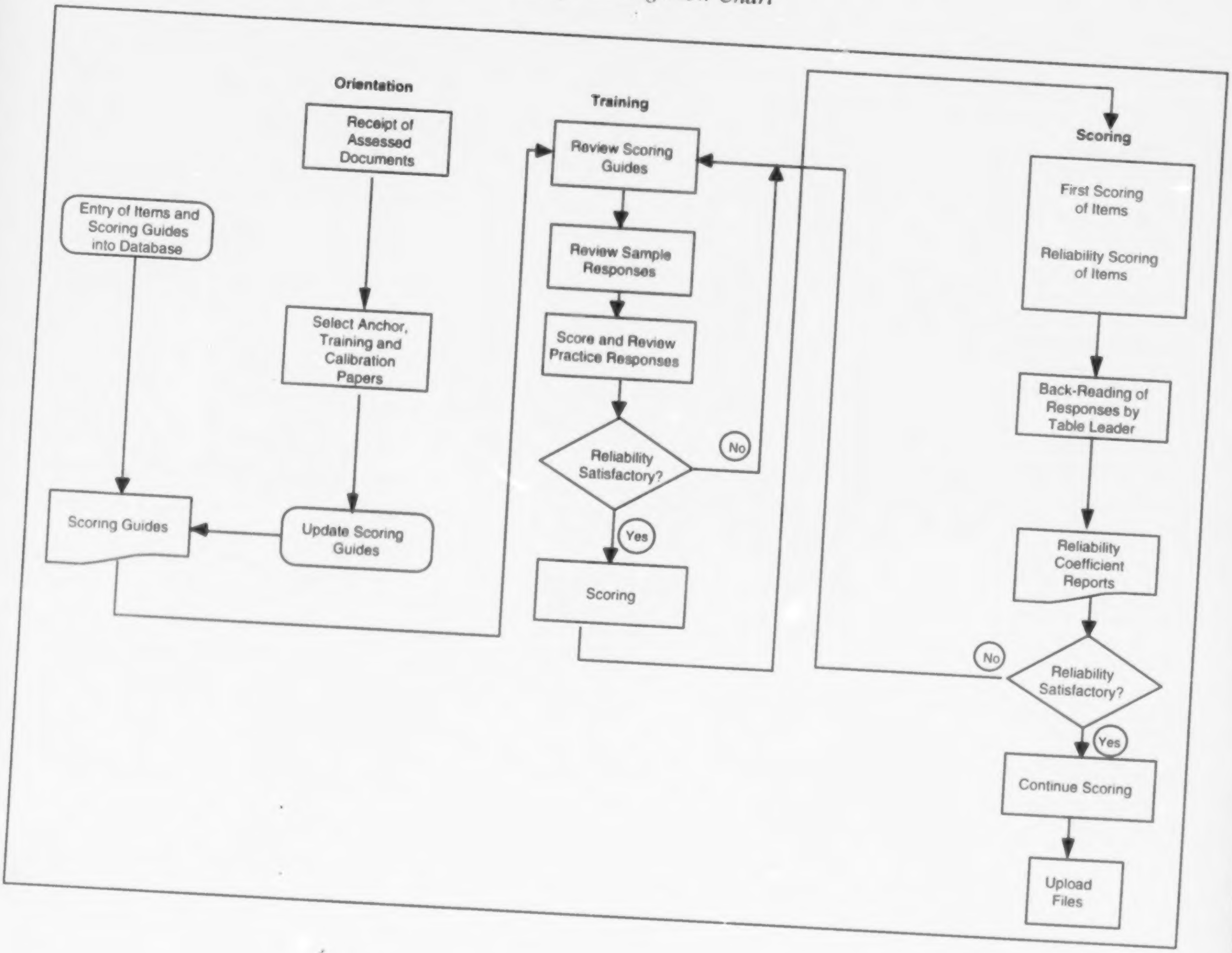
Orientation
Receipt of Assessed Documents
Entry of Items and Scoring Guides into Database
Select Anchor, Training and Calibration Papers
Scoring Guides
Update Scoring Guides
Training
Review Scoring Guides
Review Sample Responses
Score and Review Practice Responses
Reliability Satisfactory?
No
Yes
Scoring
Scoring
First Scoring of Items
Reliability Scoring of Items
Back-Reading of Responses by Table Leader
Reliability Coefficient Reports
Reliability Satisfactory?
No
Yes
Continue Scoring
Upload Files

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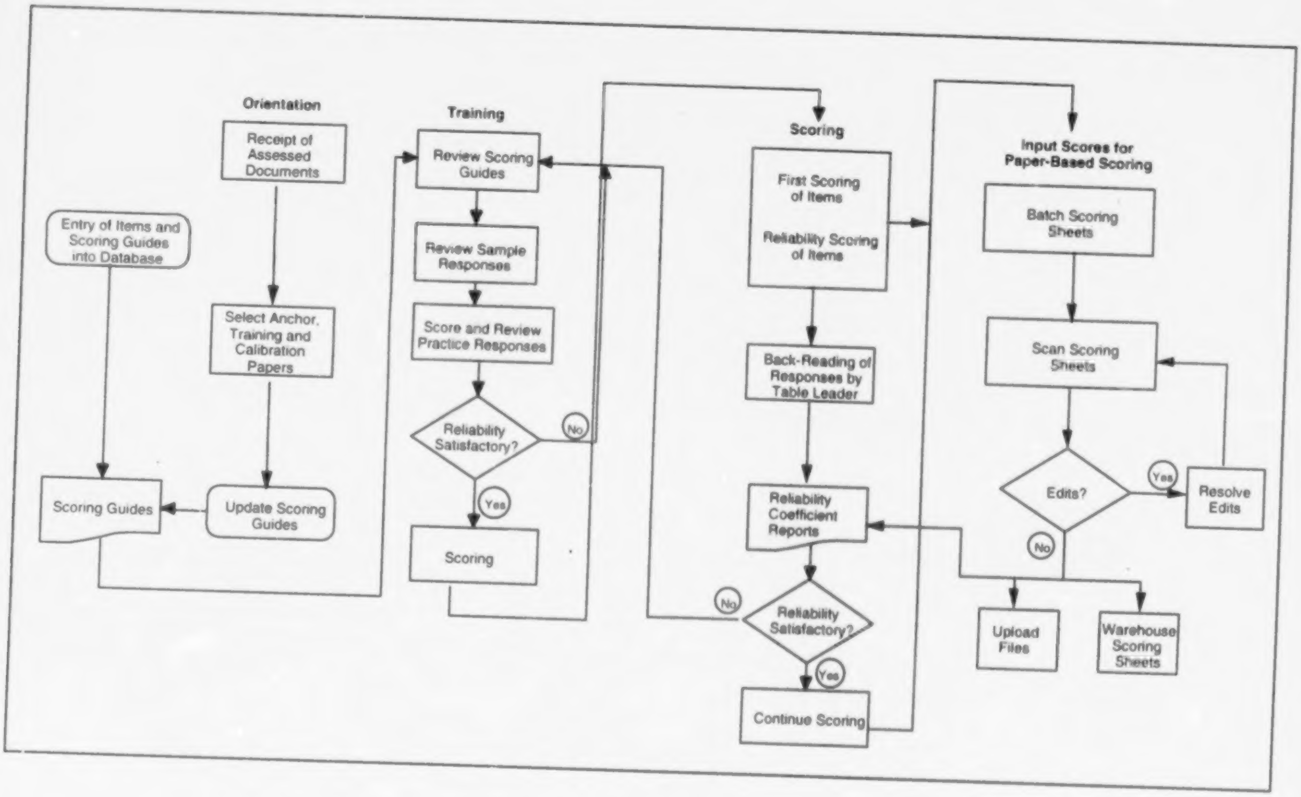
Figure 7-2

Paper Scoring Flow Chart


Orientation
Receipt of Assessed Documents
Entry of Items and Scoring Guides into Database
Select Anchor, Training and Calibration Papers
Scoring Guides
Update Scoring Guides
Training
Review Scoring Guides
Review Sample Responses
Score and Review Practice Responses
Reliability Satisfactory?
No
Yes
Scoring
Scoring
First Scoring of Items
Reliability Scoring of Items
Back-Reading of Responses by Table Leader
Reliability Coefficient Reports
Reliability Satisfactory?
No
Yes
Continue Scoring
Input Scores for Paper-Based Scoring
Batch Scoring Sheets
Scan Scoring Sheets
Edits?
Yes
Resolve Edits
No
Upload Files
Warehouse Scoring Sheets

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7.2 LONG-TERM TREND ASSESSMENTS

7.2.1 Mathematics

Items that contributed to long-term trend in mathematics items were scored as "right," "wrong," or "omitted." The scoring criteria identified the correct or acceptable answers for each item in each block. The scores for these items included a "0" for no response, a "1" for a correct answer, or a "2" for an incorrect or "I don't know" response. The reading items that appeared in the mathematics/science booklets were scored as "attempted," or "omitted." This scoring consisted of merely checking to see whether the student had responded in any way to that item, in which case the item was determined to have been reached or attempted. The scoring here was "0" for not attempting the item (blank) or "1" for any writing in the space provided. This includes one reading item in an age 9 math booklet and one reading item in an age 13 math booklet. The numbers of discrete constructed-response mathematics items can be found in Table 7-1.

Since scoring of the long-term trend mathematics items was identical to previous years, no new training papers were needed. Preparation for scoring included copying the scoring guides from previous assessment years and drawing samples from previous years, retrieving the booklets listed in the samples, and printing and matching scoring sheets for those booklets.

Because the mathematics items were scored as "right," "wrong," or "omitted," lengthy training for scoring these items was unnecessary. For each component (fall, winter, and spring), a different team was trained to follow the procedures for scoring the mathematics items and became familiar with the scoring standards, which listed general guidelines and also the correct answer for the items in each of the blocks. Each season, the entire scoring was done in one or two weeks at the end of the administration period. The number of booklets processed and the number of constructed responses scored for each age level are reported in Table 6-1 in Chapter 6.

A different team scored each age level at the time of year the age level was assessed. The booklets arrived in sessions, so each reader scored all items in all mathematics booklet types during the course of the project. All scorers held the same qualifications as the readers for main and state assessments. The number of readers, table leaders, and dates of scoring are reported in Table 7-2.

To establish the consistency of scoring across years, the readers rescored a subset of the responses from previous assessments. Samples of 350 responses to each item from the 1990 assessment and 250 from the 1994 assessment were drawn. The Performance Assessment Scoring Center (PSC) score sheet scanning system gave real-time reports comparing the original scores to the scores assigned by this year's team. The team also second scored 33 percent of the current year sample to measure consistency of scoring. The table leaders monitored daily interreader agreement reports and t-tests to verify consistency of scores within year and across years. Summaries of the interreader agreement figures can be found in Table 7-3.

Table 7-1

Number of Constructed-Response Items by Score-Point Levels

Subject Age/Grade	2-Category	3-Category	4-Category	5-Category	6-Category	Total
Mathematics Long-Term Trend						
Age 9	29	0	0	0	0	29
Age 13	28	0	0	0	0	28
Age 17	29	0	0	0	0	29
Total	86	0	0	0	0	86
Reading Long-Term Trend						
Age Class 9	9	0	1	2	2	14
Age Class 13	8	0	2	4	1	15
Age Class 17	8	0	3	4	1	16
Total	25	0	6	10	4	45
Writing Long-Term Trend						
Age Class 9	0	2	4	0	0	6
Age Class 13	1	1	5	0	0	7
Age Class 17	3	0	6	0	0	9
Total	4	3	15	0	0	22
Writing Long-Term Trend (Holistic Scoring)						
Age Class 9	0	0	0	0	2	2
Age Class 13	0	0	0	0	2	2
Age Class 17	0	0	0	0	2	2
Total	0	0	0	0	6	6
Bilingual Mathematics						
Grade 4	1	7	1	1	0	10
Grade 8	1	9	2	0	0	12
Total	2	16	3	1	0	22
Mathematics New Items						
Grade 4	0	18	14	7	0	39
Grade 4/8	0	5	0	0	0	5
Grade 8	5	30	5	6	0	46
Grade 8/12	0	4	1	2	0	7
Grade 12	2	29	4	8	0	43
Grade 4/8/12	0	0	0	0	0	0
Total	7	86	24	23	0	140
Mathematics Short-Term Trend (Base Year 1990)						
Grade 4	0	18	14	7	0	39
Grade 4/8	0	5	0	0	0	5
Grade 8	5	30	5	6	0	46
Grade 8/12	0	4	1	2	0	7
Grade 12	2	29	4	8	0	43
Grade 4/8/12	0	0	0	0	0	0
Total	7	86	24	23	0	140

(continued)

Table 7-1 (continued)

Number of Constructed-Response Items by Score-Point Levels

Subject Age/Grade	2-Category	3-Category	4-Category	5-Category	6-Category	Total
Mathematics Short-Term Trend (Base Year 1992)						
Grade 4	5	4	2	2	0	13
Grade 4/8	1	1	2	5	0	9
Grade 8	5	4	1	3	0	13
Grade 8/12	1	1	0	0	0	2
Grade 12	2	3	4	4	0	13
Grade 4/8/12	0	3	1	0	0	4
Total	14	16	10	14	0	54
Science						
Grade 4	7	52	10	2	0	71
Grade 4/8	2	47	8	1	0	58
Grade 8	1	41	17	0	0	59
Grade 8/12	2	50	8	0	0	60
Grade 12	4	83	32	6	1	126
Total	16	273	75	9	1	374

Table 7-2

Professional Scoring - Readers and Dates

Assessment	Number of Table Leaders	Number of Scorers	Dates
Fall Long-Term Trend Reading/Writing	1	7	11/29/95-1/5/96
Fall Long-Term Trend Mathematics	0	11	12/18/95-1/5/96
Winter Long-Term Trend Reading/Writing	1	6	1/30/96-4/3/96
Winter Long-Term Trend Mathematics	1	9	3/25/96-3/29/96
Spring Long-Term Trend Reading/Writing	1	6	4/10/96-5/24/96
Spring Long-Term Trend Mathematics	1	5	5/13/96-5/24/96
Long-Term Trend Writing Holistic	7	56	6/10/96-61/6/96
Long-Term Trend Writing Mechanics	6	33	7/15/96-7/31/96
Mathematics Segment 1 Days	8	72	3/13/96-4/5/96
Mathematics Segment 2 Days	9	126	4/8/96-5/6/96
Mathematics Segment 2 Evenings	5	70	4/8/96-5/2/96
Bilingual Mathematics	0	4	5/2/96-5/3/96
Science Segment 1 Days	3	24	3/18/96-4/5/96
Science Segment 2 Days	3	27	4/8/96-5/3/96
Science Segment 2 Evenings	5	70	4/8/96-5/2/96
Science Segment 3 Days	12	156	5/6/96-6/7/96
Science Segment 3 Evenings	12	150	5/6/96-6/7/96

Table 7-3
Interreader Reliability Ranges

Assessment[1]	Number of Unique Items Total	Number of Items in Percentage Exact Agreement Range			
		60-69%	70-79%	80-89%	Above 90%
Fall Long-Term Trend Reading/Writing	13	0	0	3	10
Fall Long-Term Trend Mathematics	28	0	0	0	28
Winter Long-Term Trend Reading/Writing	11	0	0	0	11
Winter Long-Term Trend Mathematics	29	0	0	0	29
Spring Long-Term Trend Reading/Writing	14	0	0	6	8
Winter Long-Term Trend Mathematics	29	0	0	0	29
Long-Term Trend Writing Holistic[2]	6	0	0	1	5
Long-Term Trend Writing Mechanics	3	N/A	N/A	N/A	N/A
4th Grade Mathematics	80	0	0	2	78
8th Grade Mathematics	102	0	0	4	98
12th Grade Mathematics	100	0	1	9	90
4th Grade Science	94	0	0	13	81
8th Grade Science	125	0	0	20	105
12th Grade Science	156	0	0	26	130

[1] Not all long-term trend items received second scoring. Figures are included here only for those that were second scored.

[2] Figures for long-term trend writing holistic include adjacent scores.

7.2.2 Reading and Writing (Primary Trait)

All of the writing items for the three long-term trend assessments (fall, winter, and spring) were scored using the primary trait method. This method focused on the writer's effectiveness in accomplishing specific assigned tasks. The primary trait scoring criteria defined five levels of task accomplishment:

1. not rated,
2. unsatisfactory,
3. minimal,
4. adequate, and
5. elaborated.

The scoring standard for each item described these levels in detail. Some of these items were also scored for secondary traits, which involved indicating the presence or absence of elements that were of special significance to a particular item (e.g., whether notes were made before writing or whether critical information was filled out on a form).

The scoring guides for the constructed-response reading items focused on students' abilities to perform various reading tasks:

- identifying the author's message or mood and substantiating their interpretation,
- making predictions based on given details, and
- comparing and contrasting.

The guides for the reading items varied somewhat, but typically included a range of scores denoting inability to address the task, unsatisfactory responses, minimal ability in accomplishing the task, satisfactory ability in addressing the task, or elaborated responses addressing the task fully. Some of the reading items received scores for secondary traits based on what reactions or information the student gave (i.e., whether the response was mostly content based, form based, a subjective reaction, or some combination of the three).

The scoring guides for the constructed-response writing items focused on students' abilities to write in informative, persuasive, and narrative styles. The guides for the writing items were based on a range of scores denoting unsatisfactory writing to address the task, minimal writing to address the task, satisfactory writing to address the task, and elaborated writing to address the task.

The item known as "The Door" was scored for attemptedness only. The readers coded all blanks as "0" and any attempt to answer as a "1."

The numbers of discrete constructed-response reading and writing items can be found in Table 7-1.

As with mathematics, the scorers used the same training materials as in previous assessments for reading and writing. Thus, there was no need to select new training material from current year responses. Preparation for the three long-term trend scoring projects began with identifying samples from previous years as indicated below. Scores assigned in assessment booklets from 1984 (reading responses) and 1988 (writing responses) had been masked in previous years to ensure that scoring for training, and subsequent long-term trend reliability scoring, would be done without knowledge of the previous scores given. The 1994 booklets required no masking because scores had never been written directly in the booklets. Finally, clerical support staff members matched scoring sheets with the booklets selected for rescore after they had been pulled from the warehouse.

The formal training for the long-term trend assessments was divided into two parts to accommodate the reading and writing items. The reading/writing long-term trend scoring project started with one team of seven readers with one table leader for fall trend. Six of the same scorers and the same table leader continued for winter and spring trends. Dates for scoring the three seasons of trend booklets are given in Table 7-2. During training each reader received a photocopied packet of materials used in the 1984 scoring of the reading items and the 1988 scoring of the writing items.

Prior to scoring any 1996 reading and writing trend material, a training reliability report was generated using a 25 percent sampling of the 1984 assessment materials for reading and 1988 materials for writing. Following the formal training sessions, the readers scored this material on scannable scoring sheets produced for specific booklet types with the appropriate long-term trend items pre-printed on the scoring sheets. These sheets were then routed to scanning under a special job number to ensure that this material was labeled for training scoring only. The scoring coordinator was able to generate a computer report that listed the individual and group percent agreement by item. The system automatically compared the new score with the original score assigned in the 1984 or 1988 scoring and produced a report on the training reliability. T-tests were also generated for each item to verify comparability of scoring across years. The NCS scoring specialist then conferred with the appropriate ETS staff on this training reliability agreement report before proceeding with scoring.

All readers for this project were experienced scorers with a minimum of a bachelor's degree. One team member had scored the same long-term trend items for the 1994 assessment. The team read materials as they arrived at the scoring center, with occasional breaks in scoring when receipts were slow. The table leader monitored consistency within the current year as well as across years on a daily basis as indicated below. The number of booklets processed and constructed responses scored for each age level can be found in Table 6-1 in Chapter 6.

Reliability studies were conducted for the scoring of the long-term trend reading and writing items. For the 1996 booklets, 33 percent of the constructed-response items were scored by a second reader to produce interreader reliability statistics. In addition, a long-term trend reliability study was conducted to ensure that the scoring procedures were consistent with those used in 1984, 1988, and 1994. For this study, 350 of the 1984 reading responses and 350 of the 1988 writing responses were sampled. Also, 250 of both reading and writing responses from 1994 were sampled for rescore. The scoring of these long-term trend samples was intermixed with the scoring of the 1996 reading and writing trend material. The readers selected a bundle of approximately five of each booklet type each day and gridded their scores on separate scannable scoring sheets for each item. These sheets were then scanned and cross-referenced with the original data tape to extract information for long-term trend reliability reporting. T-tests were generated daily to verify comparability of scoring across years. Note that only primary trait scores were compared in the across-year rescore. Secondary traits and items scored for attemptedness only were not second scored in the current year nor rescored in the long-term trend sample. Composite ranges of interreader reliability figures can be found in Table 7-3.

7.2.3 Holistic Writing Scoring

Certain writing items included in the long-term trend assessment were scored holistically. Holistic scoring is based on an overall judgment of writing fluency and structure. Because a six-point holistic scale was used, no scores fell exactly in the middle of the scale. This was done to force readers to categorize a student's response into either the top half or the bottom half of the scale. Within the upper and lower halves of the scale, the scores reflected the degree to which the student demonstrated fluency, structure, or both, in responding to the prompt.

In the 1996 holistic scoring session, two items were scored from each of the three grade levels. The items scored at grade 4 were

- *flashlight*, an imaginative task, and
- *spaceship*, a persuasive task.

At grades 8 and 11, the two items scored were

- *food on the frontier*, an informative task, and
- *recreation opportunities*, a persuasive task.

The responses scored were taken from six assessment years: 1984, 1988, 1990, 1992, 1994, and 1996. Fifty-six readers participated in the 1996 holistic scoring session. They were organized into seven teams of eight readers, with each team led by a table leader and assisted by one clerical aide.

The total number of responses scored, readers, table leaders, and dates are given in Table 6-1 in Chapter 6. Detailed lists of responses broken down by prompt, grade, and year are given in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

7.2.3.1 Materials Preparation

All grade-eligible student booklets with on-task scores were selected from each of the six assessment years and assembled into bundles of 25 booklets each. Bundle header sheets were then generated from the existing data file of student booklet identification numbers. The system assigned the first 25 grade-eligible booklet ID numbers for each specific booklet type to a bundle. The next 25 booklets for that booklet type were assigned the next consecutive bundle number, and so on until all booklets were assigned. The bundle header was placed on top of the bundle of booklets and these were then rubber-banded together. In addition to the bundle number, the bundle header showed the name of the item to be scored, the grade level, the assessment year, and the booklet ID numbers of the booklets in that bundle.

For each bundle, two sets of scoring sheets were generated—one for the first scoring and one for the second scoring. The scoring sheets indicated the bundle number, the name of the item to be scored, the grade level, the assessment year, and the booklet ID number. Second scoring sheets were generated for a random 25 percent of the booklets in each bundle. For both first and second scoring sheets, a separate sheet was generated for each booklet in the bundle.

Since some of the booklets for grades 8 and 11 contained two items to be scored during the holistic scoring, Recreation Opportunities and Food on the Frontier, two separate bundle headers and sets of scoring sheets were created for these booklets to accommodate the two scorings of the same booklets. The appropriate header and corresponding scoring sheets for both items were placed with the booklet bundle prior to scoring. Upon completion of the holistic scoring for the Food on the Frontier item, clerical staff removed the header and scoring sheets for this item and replaced them with the sheets for the Recreation Opportunities item; then the responses for the Recreation Opportunities item were scored..

All bundles were separated by item on carts. A sheet identifying the item and year was attached to each cart. Thus, all bundles could be readily identified and retrieved quickly and easily.

7.2.3.2 Training Preparation

Three days prior to the beginning of holistic scoring, the ETS writing coordinator met with the table leaders and NCS administrative assistant to prepare training materials. They first reviewed the training materials from the 1994 scoring session and augmented them with sample responses from the 1995-96 assessment. The training packets included a *familiarization and range finder* set each containing six examples, an *upper half and a lower half* set each containing three examples, and three *calibration* sets each containing four examples. The sets, together with their scoring guides and keys, can be found in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

Following standard ETS procedures, the training of the readers was conducted immediately prior to the beginning of scoring for each individual item.

7.2.3.3 Holistic Scoring Training

The training materials for the first item were distributed to each reader. Each reader read a copy of the prompt and the holistic scoring guide for that item. The scoring guide was explained by the writing long-term trend coordinator. A clerical aide was assigned to each of the seven teams to keep the materials flowing in an organized and efficient manner. Training began on June 10, 1996. The general sequence of training for each of the six prompts was as follows:

Scoring Guide and Prompt - The scoring guide was introduced and briefly discussed, followed by a reading of the prompt and a general discussion of the scoring expectations.

Familiarization Set - Readers were asked to arrange the papers in the familiarization set into 'best to worst' order, assigning a score to each paper, with no score being used more than once. The writing long-term trend coordinator announced the scores given by the table leaders for each of the individual papers in the set. The table leaders discussed with their teams the rationale behind these scores, using the scoring guide.

Range Finders - The writing long-term trend coordinator read the six range finders (best to worst) and discussed the rationale behind the scores given. If there was too much discussion regarding 'why,' an alternate range finder for that score point was inserted later. It was at this point the writing long-term trend coordinator asked the readers to look only to their range finders and no longer to the scoring guide.

Upper Half - Readers first scored three papers representing the upper half. There was a sample of a four-, a five-, and a six-score point paper included. A tally was kept of the number of readers assigning each score point. After the tally, the writing long-term trend coordinator announced the scores assigned in the preparation process and compared them to the scores on the tally sheet.

Lower Half - The readers were then asked to score three lower-half papers. This sample included a one-, a two-, and a three-score point paper. Again, a tally of the scores assigned by the individual readers was kept. The table leaders discussed the rationale behind the reader-assigned scores including both the upper and lower half score point papers at this time and answered any team member questions.

Calibration Set 1 - Prior to the beginning of scoring, the writing long-term trend coordinator assigned Calibration Set 1 consisting of four papers. After scoring Calibration Set 1, a tally was kept and the writing long-term trend coordinator announced the scores. The table leader and team discussed the readers' scores and questions.

Calibration Sets 2 and 3 - A calibration set was used after a break of longer than 15 minutes (lunch, morning break, afternoon break, or overnight). The readers reviewed the range finders and the table leaders provided a one-sentence review of each of the score points. The readers scored the set of four papers and the scores given were tallied. The tallies were kept for each of these calibration sets and can be found with the training materials in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

7.2.3.4 Holistic Scoring

Holistic scoring occurred during the week of June 10, 1996. When scoring for an item began, each reader was given a bundle to score. The reader entered his or her reader ID number in the appropriate space on each scoring sheet and scored all the responses in the bundle. The readers were directed to check the booklet number listed on the scoring sheet against the booklet ID number printed on the front of the assessment booklet. If any discrepancies were found, they were brought to the table leader for resolution.

When the first scoring of a bundle of booklets was completed, the reader handed the first scoring sheets to the clerical support staff who placed the bundle of booklets, with the bundle header and second scoring sheet still on top, back on the designated cart. NCS clerical staff distributed all bundles to the readers to ensure an even flow of material and a distribution of second scoring among teams.

Reliability scoring was handled in the same manner as first scoring. When the second scoring was completed, the second scoring sheets were placed on the table leader's desk. All bundles of booklets were placed on carts and removed from the scoring area. Clerical staff then sorted all scoring sheets and routed them to the scanning area to be entered onto the database.

The table leaders read through each reader's entire initial bundle of booklets and evaluated the scores assigned by the reader. This process is known as backreading. They also periodically backread the remaining bundles throughout the reading of each item. If discrepant scoring occurred, the table leader brought it to the attention of the reader. If the problem recurred, the reader was retrained by the table leader. If the problem continued, the writing long-term trend coordinator assisted with the re-training.

Twenty-five percent of the papers were read again by a reader from a different team. A preliminary reliability measure was taken by the administrative assistant approximately two to three hours after the beginning of scoring.

Scoring the booklets took between four and seven hours depending on the grade level and the type of writing. The readers were trained and scored the items in the following order:

Informative:	Food on the Frontier	Grade 11, followed by Grade 8
Persuasive:	Recreation Opportunities	Grade 11, followed by Grade 8
	Spaceship	Grade 4
Narrative:	Flashlight	Grade 4

The scoring was completed on Sunday, June 16, 1996. A more detailed log of daily activities can be found in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

Table 7-4
Holistic Writing Scoring Reliability Figures

Grade	Item	Exact Agreement	Adjacent Agreement
4	Flashlight	52.1%	89.6%
	Spaceship	58.3%	93.5%
8	Food on the Frontier	53.1%	94.5%
	Recreational Opportunities	58.2%	95.3%
11	Food on the Frontier	56.3%	94.5%
	Recreational Opportunities	57.1%	94.9%
	Total	**56.1%**	**94.0%**

After all the score sheets were scanned, the scanner operator produced a final report showing the n-counts scored and the interreader agreement rates. The figures are given at the item level in Table 7-4.

They are given in more detail, broken down by prompt, grade, and year, in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

7.2.4 Writing Mechanics

Mechanics scoring focused on the extent to which the writer can control the conventions of written English—grammar, spelling, capitalization and punctuation. In addition, the procedures include identifying sentence structures and word choice errors. A team of 33 readers and six table leaders scored selected essays for each age/grade group from the writing long-term trend assessments conducted in years 1988, 1990, 1992, 1994, and 1996. Spaceship, an imaginative task, was scored at age 9/grade 4 and recreation opportunities, a persuasive task, was scored at both age 13/grade 9 and age 17/grade 11.

7.2.4.1 Preparation

Essays to be scored from the 1996 assessment were selected according to ETS specifications as follows. For each booklet in which each item appeared:

1. select all grade-eligible booklets with primary trait scores greater than 0 and less than 7, in other words only on-task responses;
2. select every third booklet; and
3. select all Black students (based on the student's response in the background questions) not picked in Step 2.

As a result of this selection process, 1,593 essays were scored from the 1996 assessment. In addition, 10 percent of the essays previously scored for mechanics from the 1988, 1990, 1992, and 1994 assessments were rescored for reliability. This sample was selected by locating specific booklets from a list generated by ETS and resulted in a rescore of 736 essays for all four years.

In preparation for the scoring process, copies were made of each selected essay and its corresponding booklet cover. The booklet cover, containing assessment year, age/grade, primary sampling unit (PSU) and student ID information, was stapled to the essay. Papers were then grouped by assessment year and grade into packets of 20. Packets were numbered consecutively and were identified by headers. Three identical sets of packets (A, B, and C) were assembled since each essay had to be scored independently by two readers and discrepancies had to be resolved by a table leader. Packets A and B were used by the two readers and Packet C was used by the resolver. For prior year scoring, the same sample was used as in 1994. Therefore, copies were made from the 1994 master sets rather than returning to the original booklets. The master sets were labeled as D Packets and warehoused for potential future use.

7.2.4.2 Writing Mechanics Training

Training of the six table leaders and 33 readers was conducted by the writing long-term trend coordinator during the week of July 15, 1996. The training involved a detailed discussion of the scoring guide. The writing coordinator presented the main sections of the guide:

- type of sentence construction,
- faulty sentence construction,
- punctuation, and
- word level categorization.

Copies of pertinent resource information were distributed, briefly reviewed, and reference materials were identified. After discussion of each of the main sections of the guide, the group reviewed the scored papers from the training packet, paying special attention to scores reflecting the category under discussion.

To further train the readers, the trainer used a pool of responses from the1988 and 1990 assessments that has been scored for mechanics in 1990 but not used in the rescore sample in 1996. Copies were made of these training essays to be used for practice. Each reader then individually scored a selected group of essays. The scores were compared among the group, discussions were held when discrepancies occurred, and again references were made to resource materials or to the scored sample papers. When the group was comfortable with the decisions being made, the actual scoring began. Copies of these sets and the scoring guidelines can be found in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

7.2.4.3 Scoring

The actual scoring, resolution, data entry work and proofreading of writing mechanics began on July 18 and was completed on July 31, 1996. In selecting packets for scoring, readers alternated among the different grade levels and assessment years. The mechanics readers marked each paper with a series of symbols, addressing the elements of sentence type, sentence construction, word choice, spelling, punctuation, and capitalization. These symbols, written in red ink, designated each word or punctuation mark in error and indicated sentence type or faulty sentence construction. Each essay was scored independently by two different readers selecting either Packet A or B.

To track the movement of the packets, the NAEP internal tracking log was used. As readers and resolvers worked on particular packets, the appropriate columns were initialed and dated. This enabled NCS staff to see at a glance the status of each packet. The completed tracking logs have been warehoused with the training materials. A sample of a blank tracking log can be found in the *Report of Processing and Professional Scoring Activities* (NCS, 1996).

Resolution and quality control were conducted by table leaders who compared the scores marked on copies A and B of each unique packet and resolved any discrepancies. After determining the appropriate marks, the resolver used the unmarked copy C to record the final version. The copy with the resolved marks was sent to the word processing area in NCS's Creative Services department for transcription as described below. To avoid confusion, unused copies were discarded or returned to original readers with feedback information and with follow-up training, if deemed necessary.

To maintain a consistent scoring standard, the six table leaders, along with the NCS performance assessment specialist, met twice daily to resolve any questions that arose during the scoring. Resolution scoring allowed the table leaders to determine the accuracy of individual readers. If a reader was confused by a facet of the coding, the table leader would approach the reader individually. If the table leaders identified a trend in the coding, the issue would be broached at the re-calibration sessions. Twice a week, for approximately 30 minutes on Wednesday mornings and Friday afternoons, the six tables stopped scoring and re-calibrated; table leaders brought up pertinent scoring issues and readers asked for clarification on coding decisions.

Resolved packets were sent to the NCS Creative Services department where the text of the essays, along with the assigned marks and identification information, were entered into a data file. Essays were typed exactly as they were written. Each essay was typed on a separate page and double-spaced pages were printed for proofreading. The scoring team proofread the data entry work against the scored papers. Student identification and PSU numbers were checked and discrepancies were resolved. Corrections were indicated in red on the typed copy. If corrections were needed, all pages belonging to a packet were returned to the Creative Services department for additional corrections. Complete and correct packets were uploaded to the NCS mainframe. The data were reformatted according to ETS specifications and a data file containing the scored information was sent to ETS on August 7, 1996.

7.3 MAIN NAEP ASSESSMENT

7.3.1 Selection of Training Papers

A pool of papers to be used for training for the NAEP main assessments was selected by NCS in February and March of 1996. Persons identified as potential mathematics and science table leaders were selected to copy student responses. Team leaders, with assistance of the potential table leaders, gave tentative scores to the responses and selected 50 student responses from each dichotomous item, 75 responses from each 3-point item, 100 responses from each 4-point item and 125 from each 5-point item. Because NCS staff screened the responses, the pool sent to the ETS test development specialists contained a full range of point values.

NCS staff numbered the papers sequentially and copied the sets. NCS retained and filed the originals and sent the copies to the appropriate subject area coordinators at ETS. ETS returned a list of the anchor and practice sets with scores to NCS staff, who used the master file copies to create training sets. NCS staff then masked the sequential reference numbers and wrote the actual scores on the anchor papers and a new sequential reference number for the training sets.

The NCS copy center and PSC clerical staff shared responsibility for making multiple copies of the sets for scorers. The master sets, team leader/trainer copy and table leader copies also had keys to the training sets. When copying was complete, the master copy was placed in the appropriate file.

7.3.2 Calibration Policies

During scoring, the teams used calibration sets to calibrate on a daily basis and to calibrate across longer periods of time. The table leader built pools of items for calibration, which were then distributed to the scorers in sets of five or ten, depending upon the complexity of the item, whenever a break of longer than 15 minutes occurred, such as after lunch or at the beginning of a new scoring day. All readers on the team scored the same calibration sets, and the system compared the scores of each reader to the scores assigned by the trainer and table leader. The table leader reviewed the interreader agreement report with the trainer and the ETS subject area coordinator, discussed any discrepancies that arose, and then proceeded with scoring.

Whenever a team returned to scoring an item after having worked on a different item in the meantime, the team scored a calibration set of 75 responses and analyzed the results before proceeding. This occurred in mathematics because many mathematics items were scored in two sessions since the first sweep through the items was done while booklets were still arriving from the field. If the item had fewer than 500 responses left out of a pool that contained both main and state samples, an extended calibration was waived. In science, the teams did not begin scoring most items until all responses to the item were available for scoring, so this type of calibration was not necessary.

Table leaders printed and archived hard copies of all calibration sets used for scoring. For more information on the functionality of the calibration tool, see Section 7.3.3.3.

7.3.3 Table Leader Utilities

Two of the significant advantages of the image-scoring system were the ease of regulating the flow of work to readers and the ease of monitoring scoring. The image system provided table leaders with tools to determine reader qualification, to backread scores, to determine reader calibration, to monitor interreader reliability, and to gauge the rate at which scoring was being completed. These various tools are described below.

7.3.3.1 Reader-Qualification Tool

One of the utilities at a table leader's disposal was a qualification algorithm used after training on extended constructed-response items. The table leader would give identical qualification packets to each reader. These packets contained 10 student responses to be independently scored by the readers. After the readers finished, the table leader would enter each reader's scores into the computer for tabulation. The computer would calculate each reader's percentage of exact, adjacent, and non-adjacent agreement with the master key. If a reader attained a percentage of exact agreement above a pre-determined threshold of 80%, the reader would be allowed to score. Readers not attaining the pre-determined threshold were handled on a case-by-case basis—typically receiving individual training by the trainer or the NCS table leader before being allowed to score. A table leader could cancel a reader's qualification to score an item if review of a reader's work indicated inaccurate scoring and that supplemental training was necessary. Note that reader qualification was required only on extended constructed-response items involving 4 or more score point levels.

7.3.3.2 Backreading Tool

After scoring began, NCS table leaders reviewed each reader's progress using a backreading utility that allowed the table leader to review papers scored by each reader on the team. Typically, a table leader reviewed responses scored by each reader in quantities similar to the amount second scored (i.e., 6% for items with both state and national samples and more for items with only a national sample). Table leaders noted the score the reader awarded each response as well as the score a second reader gave that same response. This was done as an interreader reliability check. Alternatively, a table leader could choose to review all student responses given a particular score to determine if the team as a whole was scoring consistently. Both of these review methods used the same display screen and showed the ID number of the reader and the scores awarded. If the table leader disagreed with the score given an item, he or she discussed it with the reader for possible correction. Replacement of scores by the table leader was done only with the knowledge and approval of the reader, thereby serving as a learning experience for the reader. Additionally, neither score was changed in the case where the response was second scored.

7.3.3.3 Calibration Tool

While backreading, a table leader could identify individual responses for inclusion in a pool of calibration papers. These papers could be selected because they exemplified criteria set down in the scoring rubrics or because they were unusual and pointed out less obvious aspects of the scoring guidelines. After selecting a number of papers for inclusion in the calibration set, the table leader could decide to route any number of these calibration papers to the scorers. A typical number of papers routed to scorers during a mid-scoring calibration was 10, although the image system could accommodate as many or as few as the table leader and trainer determine necessary to check the accuracy of scoring. When all scorers had completed the calibration set, the table leader could then produce an interreader reliability report on the scoring of the calibration set.

7.3.3.4 Tool for Monitoring Interreader Reliability

During the scoring of an item or the scoring of a calibration set, the table leader could monitor progress using an interreader reliability tool. This display tool could be used in either of two modes:

1. to display information of all first readings versus all second readings, or
2. to display all readings of an individual that were also scored by another reader versus the scores assigned by the other readers.

The information was displayed as a matrix with scores awarded during first readings displayed in rows and scores awarded during second readings displayed in columns for Mode 1 and the individual's scores in rows and all other readers in columns for Mode 2. In this format, instances of exact agreement fell along the diagonal of the matrix. For completeness, data in each cell of the matrix contained the number and percentage of cases of agreement (or disagreement). The display also contained information on the total number of second readings and the overall percentage of exact agreement on the item. Since the interreader reliability reports were cumulative, a printed copy of the exact agreement of each item was made every day and compared to previously generated reports.

7.3.3.5 Tool for Monitoring the Rate of Scoring

The table leaders were able to monitor work flow using a status tool that displayed the number of items scored, the number of items first-scored that still needed to be second-scored, the number of items remaining to be second-scored, and the total number of items remaining to be scored. This allowed the team leaders and performance assessment specialists to accurately monitor the rate of scoring and to estimate the time needed for completion of the various phases of scoring.

7.3.3.6 Scoring Buttons

To assign a score, readers clicked the mouse over a button contained in the scoring window. Since buttons were included only for valid scores, there is no need to edit for out-of-range scores. Another recent development was the implementation of a tool that allowed the performance assessment specialist to label scoring buttons with key phrases, correct responses or certain incorrect responses that were to be tracked. This enhanced scoring as readers no longer had to mentally translate a student's response into a numerical value before choosing a scoring button on the image screen.

7.3.4 Main Mathematics Assessment

The mathematics portion of the 1996 main assessment included a total of 226 discrete constructed-response items. Table 7-1 shows the types and number of constructed responses for the mathematics assessment. A variety of constructed-response items were used to measure different elements of students' mathematical sophistication and understanding. These items were administered in scannable assessment booklets. The bilingual booklets were key-entry documents. The items scored included traditional computational items, short-answer constructed responses, extended constructed responses, diagrams, geometric figures, and graphs. Each constructed-response item had a unique scoring guide that identified the range of possible scores for the item and defined the criteria to be used in evaluating student responses. Long-term trend items that focused on the students' computational ability were typically scored on a right/wrong basis. The scoring guides for the more complex items were developed to be of diagnostic value, by including categories that reflected partial credit and/or different kinds of incorrect answers that indicated particular misunderstandings. New items developed for the 1993 and 1995 NAEP field tests were scored on a partial-credit scale (3-point or 4-point) or on an extended scale (5-point).

The operational assessment included, for the first time other than the field test, blocks that were based on a theme. There were two different theme blocks administered at each grade. General information on the number of constructed responses scored can be found in Table 6-1 in Chapter 6. Table 7-5 gives more detailed information by grade and booklet type (spiral, estimation, theme, and advanced).

7.3.4.1 Training

The training for each mathematics item was conducted by mathematics specialists from ETS and NCS just prior to the scoring of that item. Training and scoring began on Wednesday, March 13, and ended on Monday, May 6, 1996. The NCS mathematics performance assessment specialist and selected NCS team leaders conducted all the training of the short-term trend items scored in March. The ETS mathematics coordinator met with each trainer individually before the beginning of training to discuss any questions and/or discrepancies. He returned to NCS at the beginning of April to review individually the items assigned in April. The NCS training staff added another team leader to assist in training for the evening shift in April.

Training involved explaining the item and its scoring guide and discussing responses that represented the various score points in the guide. When this was completed, the readers scored and discussed from 5 to 35 selected "practice papers" for each item. Next, readers practiced scoring by gathering around a single image terminal and scoring several responses to the item. Once the trainer and the table leader determined the individuals on the team understood the scoring guide, the table leader qualified the scorers to enter the system using the reader-qualification tool, discussed in Section 7.3.3.1.

Table 7-5

Mathematics Constructed Responses Scored

						Assessment Proportions	
Type	**Data**	**1990**	**1992**	**1996**	**Grand Total**	**1996 National**	**1996 State**
			Grade 4				
Regular	Unique items	12	36	64	112	7.9%	92.1%
	Responses first scored	0	0	2,037,866	2,037,866	160,584	1,877,282
	Responses second scored	8,988	27,031	122,272	158,291	9,635	112,637
	First and second scored	8,988	27,031	2,160,138	2,196,157	170,219	1,989,919
	Average % exact agreement	95.9	93.8	96.8	95.7		
Estimation	Unique items	0	0	3	3		
	Responses first scored	0	0	7,317	7,317		
	Responses second scored	0	0	439	439		
	First and second scored	0	0	7,756	7,756		
	Average % exact agreement	N/A	N/A	93.3	93.3		
Theme	Unique items	0	0	13	13		
	Responses first scored	0	0	23,800	23,800		
	Responses second scored	0	0	5,950	5,950		
	First and second scored	0	0	29,750	29,750		
	Average % exact agreement	N/A	N/A	95.8	95.8		
Total	Unique items	12	36	80	128		
	Responses first scored	0	0	2,068,983	2,068,983		
	Responses second scored	8,988	27,031	128,661	164,680		
	First and second scored	8,988	27,031	2,197,644	2,233,663		
	Average % exact agreement	95.9	93.8	96.5	95.7		
	Average % exact agreement	95.9	93.8	96.5	95.7		
			Grade 8				
Regular	Unique items	18	44	69	131	9.3%	90.7%
	Responses first scored	0	0	1,991,682	1,991,682	184,683	1,806,999
	Responses second scored	13,374	33,077	119,501	165,952	11,081	108.420
	First and second scored	13,374	33,077	2,111,183	2,157,634	195,764	1,915,419
	Average % exact agreement	95.3	94.4	96.6	95.7		
Estimation	Unique items	0	0	6	6		
	Responses first scored	0	0	13,622	13,622		
	Responses second scored	0	0	3,405	3,405		
	First and second scored	0	0	17,027	17,027		
	Average % exact agreement	N/A	N/A	97.3	97.3		
Theme	Unique items	0	0	13	13		
	Responses first scored	0	0	27,690	27,690		
	Responses second scored	0	0	6,923	6,923		
	First and second scored	0	0	34,613	34,613		
	Average % exact agreement	N/A	N/A	93.9	93.9		

(continued)

Table 7-5 (continued)

Mathematics Constructed Responses Scored

						Assessment Proportions	
Type	**Data**	**1990**	**1992**	**1996**	**Grand Total**	**1996 National**	**1996 State**
			Grade 8				
Advanced	Unique items	0	0	14	14		
	Responses first scored	0	0	33,354	33,354		
	Responses second scored	0	0	8,339	8,339		
	First and second scored	0	0	41,693	41,693		
	Average % exact agreement	N/A	N/A	95.1	95.1		
Total	Unique items	18	44	102	164		
	Responses first scored	0	0	2,066,348	2,066,348		
	Responses second scored	13,374	33,077	138,168	184,619		
	First and second scored	13,374	33,077	2,204,516	2,250,967		
	Average % exact agreement	95.3	94.4	96.1	95.5		
			Grade 12[2]				
Regular	Unique items	21	44	73	138	N/A	N/A
	Responses first scored	0	0	212,774	212,774	N/A	N/A
	Responses second scored	15,225	32,387	12,766	60,378	N/A	N/A
	First and second scored	15,225	32,387	225,540	273,152	N/A	N/A
	Average % exact agreement	94.8	92.1	95.6	94.4		
Theme	Unique items	0	0	12	12		
	Responses first scored	0	0	23,368	23,368		
	Responses second scored	0	0	5,842	5,842		
	First and second scored	0	0	29,210	29,210		
	Average % exact agreement	N/A	N/A	94.5	94.5		
Advanced	Unique items	0	0	15	15		
	Responses first scored	0	0	44,881	44,881		
	Responses second scored	0	0	11,220	11,220		
	First and second scored	0	0	56,101	56,101		
	Average % exact agreement	N/A	N/A	95.1	95.1		
Total	Unique items	21	44	100	165		
	Responses first scored	0	0	281,022	281,022		
	Responses second scored	15,225	32,387	29,829	77,441		
	First and second scored	15,225	32,387	310,851	358,463		
	Average % exact agreement	94.8	92.1	95.4	94.5		
Grand Total - Unique items		51	124	282	457		

[1] 4th grade mathematics had no advanced booklets.

[2] 12th grade estimation block had no constructed-response items.

7.3.4.2 Scoring

Mathematics scoring took place in two segments over two shifts as outlined in Table 7-2. Most dichotomously scored short-term trend items were scored in Segment 1, with the remainder of the items scored in Segment 2.

During scoring, the team leaders continued to compile notes on scoring decisions for the readers' reference and guidance. Additionally, table leaders closely monitored interreader reliability using both team and individual statistics as a reference. Consistently throughout the scoring of each item, the table leaders also performed backreading duties in which they reviewed a sample of the responses scored by each reader on the team. Lead scorers selected for their experience and accuracy in scoring assisted the table leaders in backreading. The team leaders and performance assessment specialist continuously monitored the progress of each team and noted all scoring-related decisions to ensure that training and scoring progressed smoothly and in a timely manner.

The codes that were used for unscorable mathematics items were:

0 = Blank or random marks
8 = Completely crossed-out or erased
9 = "I don't know," refusal, off-task, illegible or language other than English

7.3.4.3 Reliability

A minimum of 25 percent of the mathematics responses for items involved only in the national sample and 6 percent of the responses for items involved in the state and national samples were scored by a second reader to obtain statistics on interreader reliability. Responses were automatically routed for second scoring so that the reader could not discern any difference between a response being presented for first or second scoring. The reliability figures were available to the table leader as soon as scoring began and could be viewed on demand. These figures included a frequency distribution of all second scores for the team and a frequency distribution for all second scores for individual members of the team who scored the item. Ranges for interreader reliability figures for mathematics are reported in Table 7-3. Average reliabilities, given in terms of percentage exact agreement, for each booklet type (spiral, estimation, theme, and advanced) are reported in Table 7-5. This reliability information was also used by the table leader in monitoring the capabilities of all readers and the uniformity of scoring across readers. When scoring was completed for an item, a hard copy of the report was printed for analysis by ETS project staff.

7.3.4.4 Short-Term Trend

The 1996 main assessment of mathematics included a number of items that had previously been used in the 1990 and 1992 assessments. A list of these items is included in the tables in Appendix J. For these items, the trainers used the same scoring guides and training sets as in 1992. Also, for those items that originated in the 1992 assessment, 750 responses from 1992 were scanned into the scoring system and rescored. For those items that originated in the 1990 assessment, the sample included 750 responses each from 1990 and 1992. Table leaders used the management tools to distribute the rescore responses out among the current-year material. Because the rescore responses could not be seeded into the current materials, the table leaders divided the rescore material into thirds, inserting about 25 responses per scorer at various intervals during scoring. Since the development group had loaded the original scores from the previous years, the system was able to give real-time comparisons of scores. Table leaders, trainers, and the NCS and ETS subject area specialists monitored the interreader agreement rates and t-tests across years for all items used in the short-term trend.

7.3.4.5 Paper Scoring

Some mathematics items could not be scored on the image system because of printing problems or difficulties with overlay templates. When scoring these items, professional readers coded any response that could not be scored by viewing the image with a designated code such as "8" or "pull." The development group created a list of all responses coded for pulling, and the project coordinator led the effort to pull these booklets from the warehouse. The booklets were then transported to the PSC, where professional readers scored them using the same scoring guides, but marking their scores on scannable scoring sheets. Clerical support staff then scanned the sheets and uploaded the file to the mainframe, where the development team merged the data with the image scoring data.

As soon as the last item on any score sheet was completed, the score sheets were collected and taken to a central clerical support area to be scanned on the NCS paper-based scoring system using OpScan 5 scanners. As each sheet was processed, the scanning system compared the incoming data with tables to ensure that all responses were scored with one and only one valid score, and that only raters who were qualified to score an item were allowed to score it. Any discrepancies (e.g., no score assigned, double gridding, out-of-range scores, or invalid scorer ID numbers) were flagged and resolved before the data from that sheet were accepted into the scoring system. Interreader agreement reports were generated twice a day.

All the scoring data were stored on personal computers at NCS after all the responses for a subject area had been scanned. Upon completion of scoring, the scanner operator ran a query which compared the sheets scanned with a table of records in the system to make sure that all score sheets were accounted for. Once all edits were corrected, the personal computer file was renamed and put into an export file, which automatically created the mainframe file. This file was then uploaded to the mainframe to be merged with the mainframe student files.

7.3.4.6 Large Print

To accommodate students with visual impairment, field administrators had Braille and large print versions of designated booklets available to sampled students who qualified for them. The scoring center received no Braille material for scoring. Two large print booklets were received back for scoring. One of the large print booklets was completely blank. The NCS performance assessment specialist in charge of mathematics scored all the items in the other booklet and gave the scores to the development team to enter into the database.

7.3.4.7 Bilingual Scoring

Some students who participated in the main fourth- and eighth-grade mathematics assessments received bilingual booklets. All students who used bilingual booklets received the equivalent of Booklet 121 for their grade. The same blocks with the same items appeared in the bilingual booklets as in the regular Booklet 121, with the exception that the bilingual booklets contained both Spanish and English versions of each item. The items appeared in Spanish on the left-hand pages and in English on the right-hand pages. The instructions told students to answer according to their preference. Altogether, the PSC scored 91 bilingual booklets at grade 4 and 36 at grade 8.

Because of the small number of booklets involved, the PSC selected a team of four readers to score all of the booklets on paper. The team consisted of two males and two females. Two of the scorers were born in Chile, South America, and raised partly in Chile and partly in the United States. Both of them have traveled and recently lived extended periods of time in South America, while making the United States their permanent home. The third scorer comes from a Panamanian-American background. Born and raised in a bilingual family, he holds a bachelor's degree in Spanish, has lived extended periods of time in Panama and Mexico, and has experience teaching university-level Spanish as well as working several years in a business position that required daily telephone and correspondence contact with Spanish-speaking clientele, mainly from Puerto Rico. The fourth scorer, while not a native speaker of Spanish, holds a master's degree in Spanish, has traveled and studied extensively in Mexico, the Caribbean and South America, coordinated an adult education program for Spanish-speaking immigrants from Mexican and Central American backgrounds for three years, taught university-level Spanish for eight years, and worked in customer relations positions for four years dealing with Spanish-speaking clientele, mainly from Puerto Rico.

The NCS mathematics specialist trained all four readers on the fourth-grade items on Thursday, May 2, 1996, and the team scored all of the fourth-grade booklets the same day. On Friday, May 3, the team learned the eighth-grade items, many of which overlapped with the fourth-grade items, and scored all of the eighth-grade booklets on that day. Twenty-five percent of the booklets were scored by a second reader to measure interreader agreement.

The team applied the same scoring guides that were used for regular scoring. However, two scores were assigned for each item, one for the Spanish side and one for the English side. Since most students answered relatively consistently on either one side or the other, most booklets received on-task scores for one language and blanks for the other language. This procedure will allow analysts to separate the data of those students who answered in English from those who answered in Spanish. Several students wrote their answers in English on the side of the page where the item was written in Spanish. In these cases, the scorers coded the score as a Spanish answer since that is where the student read the item and wrote the answer. During the course of scoring, the team noted that over half of the fourth-grade booklets came from the same school, and not a single student from that school answered any questions in Section 3 of the booklet.

The same scanning procedures were performed as outlined in Section 7.3.4.5.

7.3.5 Main NAEP Science

The science portion of the 1996 NAEP included a total of 374 discrete constructed-response items (see Table 7-1). It was scored over three segments and two shifts (see Table 7-2). Many kinds of constructed-response items were utilized in the assessment to measure different elements of students' conceptual understanding of scientific material as well as their practical reasoning ability. The items scored included short-answer constructed responses and extended constructed responses. Each constructed-response item had a unique scoring guide that identified the range of possible scores for the item and defined the criteria to be used in evaluating student responses.

During the course of the project, each team scored short constructed-response items using a scale that allowed for partial credit as follows:

1 = incorrect response
2 = partial understanding
3 = correct response

The readers scored extended constructed-response items on a scale of "1" to "4" as follows:

1 = incorrect response
2 = minimal understanding
3 = satisfactory level of comprehension
4 = correct response

7.3.5.1 Training

The training on each item was conducted by science specialists from ETS and NCS. The first teams began training on March 18, 1996. Other teams were phased in throughout the project. Hands-on items were scored a block at a time with a unique scoring guide for each item because of the related nature of the items. The rest of the assessment was scored item-by-item so that each reader worked on only one set of rubrics at a time. After scoring all available responses, a team would then proceed with training and scoring the next item. Scoring was completed on June 7, 1996. Table 7-2 gives detailed information on the dates of scoring and the number of readers and table leaders.

Training involved explaining the item and its scoring guide to the team and discussing responses that represented the various score points in the guide. Typically, two or three anchor responses were chosen for each score point. During this stage, readers and the table leader kept notes of scoring decisions. The table leader was then responsible for compiling those notes and ensuring that all readers were in alignment. When review of the anchor packet was completed, the readers scored and discussed 10 to 20 pre-scored "practice papers" that represented the entire range of score points the item could receive. After the trainer and table leader determined that the team had reached consensus, the table leader then released work on the image-scoring system to the readers. The readers would initially take turns reading their first "live" responses to the team or work in pairs as a final check before beginning work individually. Once the practice session was completed, the formal scoring process began.

7.3.5.2 Scoring

All scoring for science was conducted via the image-based scoring system. During scoring, the team leaders continued to compile notes on scoring decisions for the readers' reference and guidance. Additionally, table leaders closely monitored interreader reliability using both team and individual statistics as a reference. Consistently throughout the scoring of each item, the table leaders also performed backreading duties in which they reviewed a sample of the responses scored by each reader on the team. Lead scorers selected for their experience and accuracy in scoring assisted the table leaders in backreading. The table leaders and performance assessment specialist continuously monitored the progress of each team and noted all scoring-related decisions to ensure that training and scoring progressed smoothly and in a timely manner.

Table 7-6

Science Constructed Responses Scored

		Type[1]				Assessment Proportions	
Grade	Data	Regular	Hands-On	Advanced	Grand Total	1996 National	1996 State
4	Unique items	70	24	0	94	74.8%	25.2%
	Responses first scored	200,319	94,004	0	294,323	220,271	74,052
	Responses second scored	50,080	23,501	0	73,581	55,068	18,513
	First and second scored	250,399	117,505	0	367,904	275,339	92,565
	Average % exact agreement	93.9	93.8	N/A	93.9		
8	Unique items	94	31	0	125	9.7%	90.3%
	Responses first scored	2,157,377	976,844	0	3,134,222	304,020	2,830,202
	Responses second scored	129,443	58,611	0	188,053	18,241	169,812
	First and second scored	2,286,820	1,035,455	0	3,322,275	322,261	3,000,014
	Average % exact agreement	93.4	95.0	N/A	93.8		
12	Unique items	94	26	36	156		
	Responses first scored	198,563	75,120	88,166	361,849		
	Responses second scored	49,641	18,780	22,041	90,462		
	First and second scored	248,204	93,900	110,207	452,311		
	Average % exact agreement	93.0	94.4	94.5	93.6		
Total	Unique items	258	81	36	375		
	Responses first scored	2,556,260	1,145,968	88,166	3,790,394		
	Responses second scored	229,163	100,892	22,041	352,096		
	First and second scored	2,785,423	1,246,860	110,207	4,142,490		
	Average % exact agreement	93.4	94.4	94.5	93.7		

[1] Regular and hands-on tasks include state and national constructed responses.

One advantage of utilizing an image-based scoring system is the ability to construct reader aids to simplify scoring, thus increasing reader reliability. Prior to the start of the project, the ETS subject area specialist and the NCS performance assessment specialist identified several items for the construction of overlays. Overlays serve as templates to define boundaries in which correct responses must be located or allow the placement of correct answers directly on the displayed image, and are displayed along with the student response. A schematic representation of each overlay was included with the scoring guide and sample papers for these items to familiarize readers with the use of the scoring aids during training.

General information on the number of constructed responses scored can be found in Table 6-1 in Chapter 6. Table 7-6 gives more detailed information by grade and booklet type (spiral and advanced). The codes that were used for unscorable science items were:

0 = Blank or random marks
8 = Completely cross-out or erased
9 = "I don't know," refusal, off-task, illegible or language other than English that could not be translated

7.3.5.3 Reliability

A minimum of 25 percent of the science responses for items involved only in the national sample and 6 percent of the responses for items involved in the state samples were scored by a second reader to obtain statistics on interreader reliability. Ranges for interreader reliability for science are reported in Table 7-3. Average reliabilities, given in terms of percentage exact agreement, for each booklet type (spiral and advanced) are reported in Table 7-6. This reliability information was also used by the team leaders to monitor the capabilities of all readers and maintain uniformity of scoring across readers. Reliability reports could be generated on demand by the table leader, scoring specialist, or performance assessment specialist when needed, and they were displayed at a computer workstation. In addition to the immediate feedback provided by the on-line reliability reports, each table leader could also review the actual responses scored by a reader by using the backreading tool. In this way, the table leader monitored each reader carefully and corrected difficulties in scoring almost immediately with a high degree of efficiency.

Chapter 8

CREATION OF THE DATABASE, QUALITY CONTROL OF DATA ENTRY, AND CREATION OF THE DATABASE PRODUCTS[1]

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8.1 INTRODUCTION

The data processing, scoring and editing procedures described in Chapter 6 resulted in the generation of disk and tape files containing various data for students (assessed and excluded), teachers, schools, and SD/LEP (students with disabilities/students with limited English proficiency) information. The weighting procedures described in Chapter 10 resulted in the generation of data files that included the sampling weights required to make valid statistical inferences about the population from which the 1996 fourth-, eighth- and twelfth-grade NAEP samples were drawn. These files were merged into a comprehensive, integrated database. The creation of the database is described in Section 8.2.1.

Section 8.2.2 describes a central repository or master catalog of this information. The master catalog is accessible by all analysis and reporting programs and provides correct parameters for processing the data fields and consistent labeling for identifying the results of the analyses.

To evaluate the effectiveness of the quality control of the data entry process, the corresponding portion of the final integrated database was verified in detail against a sample of the original instruments received from the field. The results of this procedure are given in Section 8.3.

The integrated database was the source for the creation of the NAEP item information database and the NAEP secondary-use data files. These are described in Section 8.4.

8.2 CREATION OF THE DATABASE

8.2.1 Merging Files

The data processing conducted by National Computer Systems (NCS) resulted in the transmittal to ETS of four data files for each of fourth, eighth and twelfth grade: one for the student background and item response data and one file for each of the three questionnaires (Teacher Questionnaire, School Characteristics and Policies Questionnaire, and SD/LEP Questionnaire). The sampling weights, derived by Westat, Inc., comprised additional files for each grade—two sets for assessed students, two sets for excluded students and for schools four sets at grade 4, five at grade 8, and six at grade 12. (See Chapter 10 for a discussion of the sampling weights.) These files at each grade were the foundation for the analysis of the 1996 NAEP data. Before data analyses could be performed, these data files had to be integrated into a coherent and comprehensive database.

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[1] John J. Ferris was responsible for the evaluation of the quality of the database and the data entry process; Katharine E. Pashley was responsible for database generation under the supervision of David S. Freund; Alfred M. Rogers created the secondary-use data files.

The database ultimately comprised four files per cohort: three student files (mathematics, science, and long-term trend) and a single school file. The student files were separated by subject area to improve maintenance and efficiency of the databases and data analyses. Each record on the student file contained a student's responses to the particular assessment booklet the student was administered (in the case of excluded students, a booklet was assigned but the student response fields contain a special code indicating no response), and the information from the questionnaire that the student's teacher completed. Additionally, for a student (assessed or excluded) who was identified as a student with a disability (SD) or of limited English proficiency (LEP), the data from the SD/LEP Questionnaire are included. This questionnaire is filled out for all students identified as SD and/or LEP, both assessed and excluded. (See Chapter 2 for information regarding assessment instruments.) Also added to the student files were variables with school-level information supplied by Quality Education Department, Inc. (QED) including demographic information about schools such as race/ethnicity percentages. Since the teacher data are not from a representative sample of teachers and since the focus of NAEP is to report student level results, the teacher response data were added to the student records. The school data were on separate files that could be analyzed on their own and could also be linked to the student files through the unique school ID code.

The creation of the student data files for fourth, eighth, and twelfth grade began with the reorganization of the data files received from NCS. This involved two major tasks:

1. the files were restructured, eliminating unused (blank) areas to reduce the size of the files; and

2. in cases where students had chosen not to respond to an item, the missing responses were recoded as either "omit" or "not reached," as discussed in Part II of this report.

Next, the student response data were merged with the student weights files. The resulting file was then merged with the SD/LEP and teacher data. In all merging steps, the 10-digit booklet ID (the three-digit booklet number common to every booklet with the same block of items, a six-digit serial number unique to the booklet a student was given and a single check digit, distinguishing bilingual booklets) was used as the matching criterion.

The school file for each grade was created by merging the School Characteristics and Policies Questionnaire file with the file of school weights and school variables, supplied by Westat. The primary sampling unit (PSU) and school codes were used as the matching criteria. Since some schools did not return a questionnaire, some of the records in the school file contained only school-identifying information and sampling weight information.

When the student and school files for each grade had been created, the database was ready for analysis. In addition, whenever new data values, such as composite background variables or plausible values, were derived, they were added to the appropriate database files using the same matching procedures described above.

For archival purposes and to provide data for outside users, restricted-use data files and codebooks for each jurisdiction were generated from this database. The restricted-use data files contain all responses and response-related data from the assessment, including responses from the student booklets, Teacher Questionnaires, and School Characteristics and Policies Questionnaires, scale scores, sampling weights, and variables used to compute standard errors.

8.2.2 Creating the Master Catalog

A critical part of any database is its processing control and descriptive information. Having a central repository for this information, which may be accessed by all analysis and reporting programs, will provide correct parameters for processing the data fields and consistent labeling for identifying the results of the analyses. The NAEP master catalog file was designed and constructed to serve these purposes for the NAEP database.

Each record of the master catalog contains the processing, labeling, classification, and location information for each data field in the NAEP database. The control parameters are used by the access routines in the analysis programs to define the manner in which the data values are to be transformed and processed.

Each data field has a 50-character label in the master catalog describing the contents of the field and, where applicable, the source of the field. The data fields with discrete or categorical response values (e.g., multiple-choice items and professionally scored items, but not weight fields) have additional label fields in the catalog containing 8- and 20-character labels for those response values. These short labels can be used for reporting purposes as a concise description of the responses for the cognitive items.

The classification area of the master catalog record contains distinct fields corresponding to predefined classification categories (e.g., mathematics content and process areas) for the data fields. For a particular classification field, a nonblank value indicates the code of the subcategory within the classification category for the data field. This classification area permits the grouping of identically classified items or data fields by performing a selection process on one or more classification fields in the master catalog.

According to NAEP design, it is possible for item data fields to appear in more than one student sample and in more than one block within each sample. The location fields of the catalog record contain age, block and, where applicable, the sequence within the block for each appearance of the data field.

The master catalog file was constructed concurrently with the collection and transcription of the State Assessment data so that it would be ready for use by analysis programs when the database was created. As new data fields were derived and added to the database, their corresponding descriptive and control information were entered into the master catalog. The machine-readable catalog files are available as part of the secondary-use data files package for use in analyzing the data with programming languages such as SAS and SPSS-X (see the *NAEP 1996 Secondary-Use Data Files User Guide,* Rogers, Kline, & Schoeps, 1999).

8.3 QUALITY CONTROL OF NAEP DATA ENTRY FOR 1996

This section describes the evaluation of the data entry process for the 1996 national assessment. As in past years, the NAEP database was found to be more than accurate enough to support the analyses that were done. Overall, the observed error rates were comparable to those of past assessments, with the possible exception of the Teacher Questionnaire data (see discussion below); they ranged from three errors per 10,000 responses for the SD/LEP Student Questionnaire data to 33 errors per 10,000 responses for the Teacher Questionnaire data.

The purpose of the analysis reported in this sction is to assess the quality of the data resulting from the complete data entry system, beginning with the actual instruments collected in the field and ending with the final machine-readable database used in the analyses. The process involved the selection of instruments at random from among those returned from the field and the comparison of these instruments, character by character, with their representations in the final database. In this way, we were able to measure the error rates in the data as well as the success of the data entry system.

Of course the observed error rate cannot be taken at face value. For example, the sample of teacher questionnaires that happened to be selected for close inspection contained 22 errors out of a total of 6,741 characters. To conclude that the entire teacher questionnaire database has an error rate of 22/6741, or .0033, would be too optimistic; we may simply have been lucky (or unlucky) with this particular random sample. What is needed is an indication of how bad the true error rate might be, given what we observed. Such an indication is provided by confidence limits. Confidence limits indicate how likely it is that a value falls inside a specified range in a specified context or distribution. In our analysis, the specified range is an error rate between zero and some maximum value beyond which we are confident at a specified level (traditionally 99.8%) that the true error rate does not lie; the specified context or distribution turns out to be the cumulative binomial probability distribution. An example should demonstrate this technique:

> Let us say that 1,000 booklets were processed, each with 100 characters of data transcribed for a total of 100,000 characters. Let us say further that five of these characters were discovered to be in error in a random sample of 50 booklets that were completely checked; in other words, five errors were found in a sample of 5,000 characters. The following expression may be used to establish the probability that the true error rate is .0025 or less, rather than the single-value estimate of the observed rate of one in a thousand (.001):
>
> $$\sum_{j=0}^{5} \binom{5000}{j} \times .0025^{j} \times (1-.0025)^{(5000-j)} = .0147$$
>
> This is the sum of the probability of finding five errors plus the probability of finding four errors plus. . . etc. . . plus the probability of finding zero errors in a sample of 5,000 with a true error rate of .0025; that is, the probability of finding five or fewer errors by chance when the true error rate is .0025. Notice that we did not use the size of the database in this expression. Actually, the assumption here is that our sample of 5,000 was drawn from a database that is infinite. The smaller the actual database is, the more confidence we can have in the observed error rate; for example, had there been only 5,000 in the total database, our sample would have included all the data, and the observed error rate would have been the true error rate. The result of the above computation allows us to say, conservatively, that .0025 is an upper limit on the true error rate with 98.53 percent (i.e., 1 - .0147) confidence; that is, we can be quite sure that our true error rate is no larger than .0025.

Virtually all of the data collected for this assessment were machine-scanned. The only exception was a set of six booklets used for the long-term trend reading and writing assessments; the format of these booklets was kept the same for comparability with earlier assessments, so these booklets had to be key-entered. As it happened, no errors at all were found in the sample of key-entered booklets selected for quality control.

In the 1994 and 1996 assessments, the selection of booklets for this comparison took place at the point of first entry into the recording process for data from the field. In earlier assessments, this selection took place only after data had reached the final database, in order to assure that only relevant booklets were involved in the quality control evaluation. The new selection process involves the risk that booklets will be selected that ultimately will not appear in the final database, however, as in 1994, sufficient numbers of booklets were in fact selected.

The individual instruments are briefly discussed in the following sections and a summary table (Table 8-1) gives the upper 99.8 percent confidence limit for the error rate for each of the instruments as well as the sampling information. The 99.8 percent confidence limit, and the selection rates noted, were chosen to make these results comparable to those of previous administrations when the same parameters were used.

Table 8-1

Summary of Quality Control Error Analysis for NAEP 1996 Data Entry

	Main Assessment Student Booklets	**Long-Term Trend Assessment Student Booklets**	**SD/LEP Student Questionnaires**	**Teacher Questionnaires**	**School Characteristics and Policies Questionnaires**
Selection Rate	1/392	1/372	1/112	1/120	1/57
Different Booklets	203	26	2	4	3
Number of Booklets Sampled	240	101	103	38	42
Number of Characters Sampled	30,134	12,082	13,098	6,741	6,633
Number of Errors	16	6	4	22	15
Observed Error Rate	.0005	.0005	.0003	.0033	.0023
Upper 99.8% Confidence Limit	.0011	.0015	.0011	.0058	.0045

8.3.1 Student Data

Data from about 94,000 students were processed across all samples in this assessment. Across all the student data, roughly one booklet in 392 was selected for close examination, which is comparable to the one in 400 target selection rate used in past assessments. The student data error rates were consistently low in all subject areas and across all three grades. The overall quality of the data was very high.

Data from some 30,000 additional students were also used in the study of long-term trends. These data showed the same consistently low error rates, as indicated in the accompanying table.

8.3.2 SD/LEP Student Questionnaire Data

In this assessment, 13,098 SD/LEP questionnaires were scanned. The quality control sampling rate was one in 112, a somewhat higher rate than that used in previous assessments. The data showed a somewhat lower error rate than in previous assessments—comparable to that for the student data. The few problems encountered involved the scanner's mistaking an erasure for a genuine response or failing to identify a multiple response as such.

8.3.3 Teacher Questionnaire Data

In this assessment, 4,585 teacher questionnaires were collected and scanned. About one percent of these questionnaires was sampled for the quality control procedure. The error rates for these questionnaires were higher than those of any other category of data, and also higher than those found for teachers in past assessments. There was some evidence that the questionnaire layout was confusing to at least some of the teachers in the part of the questionnaire that was intended to collect class period information. While the majority of teachers did not have difficulty with this, consideration is being given to a possible revision of the questionnaire, since a number of teachers also had similar problems in the NAEP State Assessment.

8.3.4 School Characteristics and Policies Questionnaire Data

In this assessment, 2,404 School Characteristics and Policies Questionnaires were collected. They were sampled at a rate of about 1 in 57. Fifteen scanning errors were found in these questionnaires, which included both regular and long-term trend schools. Most of these errors came from a single booklet that had been filled out in pen—something that frequently gives a scanner trouble.

8.4 NAEP DATABASE PRODUCTS

The NAEP database described to this point serves primarily to support analysis and reporting activities that are directly related to the NAEP contract. This database has a singular structure and access methodology that is integrated with the NAEP analysis and reporting programs. One of the directives of the NAEP contract is to provide secondary researchers with a nonproprietary version of the database that is portable to any computer system. In the event of transfer of NAEP to another client, the contract further requires ETS to provide a full copy of the internal database in a format that may be installed on a different computer system.

In fulfillment of these requirements, ETS provides two sets of database products: the item information database and the secondary-use data files. The contents, format and usage of these products are documented in the publications listed under the appropriate sections below.

8.4.1 The Item Information Database

The NAEP item information database contains all of the descriptive, processing, and usage information for every assessment item developed and used for NAEP since 1970. The primary unit of this database is the item. Each NAEP item is associated with different levels of information, including usage across years and age cohorts, subject area classifications, response category descriptors, and locations of response data on secondary-use data files.

The item information database is used for a variety of essential NAEP tasks: providing statistical information to aid in test construction, determining the usage of items across assessment years and ages for trend and "main" analyses, labeling summary analyses and reports, and organizing items by subject area classifications for scaling analysis.

The creation, structure, and use of the NAEP item information database for all items used up to and including the 1996 assessment are fully documented in the NAEP publications *A Guide to the NAEP Item Information Database* (Rogers, Barone, & Kline, 1996) and *A Primer for the NAEP Item Information Database* (Rogers, Kline, Barone, Mychajlowycz, & Forer, 1989).

The procedures used to create the 1996 version of the item information database are the same as those documented in the guide. The version of the guide contains the subject area classification categories for the cognitive items.

8.4.2 The Secondary-Use Data Files

The secondary-use data files are designed to enable any researcher with an interest in the NAEP database to perform secondary analysis on the same data as those used at ETS. The data, documentation and supporting files are distributed on CD-ROM media. For each sample in the assessment, the following files are provided: the response data file; a printable codebook file; a file of control statements that will generate an SPSS system file; a file of control statements that will generate a SAS system file; and a machine-readable catalog file. Each codebook file is in portable document file (PDF) format, which may be browsed, excerpted and printed using the Adobe Acrobat Reader program on a variety of platforms. Each machine-readable catalog file contains sufficient control and descriptive information to permit the user who does not have either SAS or SPSS to set up and perform data analysis.

The remainder of this section summarizes the procedures used in generating the data files and related materials.

8.4.2.1 File Definition

The design of the 1996 assessment perpetuates two features of the 1990, 1992, and 1994 assessment design: the focused-BIB booklet design and the direct matching of teacher questionnaires to student assessment instruments. In addition, the sample of students who were excluded from the assessment is now incorporated into the appropriate assessed student subject area sample.

The focused-BIB design within the main assessment isolates the primary subject areas to separate groups of booklets. This permits the division of the main sample into subject-specific subsamples. The data files generated from these subsamples need only contain the data that are relevant to their corresponding subject areas and are therefore smaller and more manageable than their counterparts in previous assessments.

According to the design of the 1984, 1986, and 1988 assessments, only a sample of the teachers of the assessed students were asked to fill out the teacher questionnaires. The large size of the secondary-use main student files and the relatively low matching rate between students and teachers made it impractical if not physically prohibitive to produce a complete file with student and teacher information. Both the 1984 and 1986 secondary-use data packages had separate teacher data files which could be linked to the student data files for analysis. The teacher file in the 1988 secondary-use data package contained not only the teacher response data, but also the data from the students who could be matched to teacher questionnaires. This type of file was more appropriate for the analysis of teacher data because it defined the student as the unit of observation.

The intent of the 1996 assessment design was to collect data from mathematics or science teachers of the main assessment students at specified grade levels who were administered mathematics or science booklets. A portion of the teacher questionnaire contained questions that were directly related to each matched student. This change in the design afforded a very high matching rate between student and teacher data. Therefore, for those subject areas in each grade cohort for which teacher data were collected, the teacher responses were appended to each student record in the secondary-use data files.

8.4.2.2 Definition of the Variables

The initial step in the variable definition process was the generation of a LABELS file of descriptors of the variables for each data file to be created. Each record in a LABELS file contains, for a single data field, the variable name, a short description of the variable, and processing control information to be used by later steps in the data generation process. This file could be edited for deletion of variables, modification of control parameters, or reordering of the variables within the file. The LABELS file is an intermediate file only; it is not included on the released data files.

The variables on all data files are grouped and arranged in the following order: identification information, weights, derived variables, proficiency scores (where applicable), and response data. On the student data files, these fields are followed by the teacher response data and the SD/LEP student questionnaire data, where applicable. The identification information is taken from the front covers of the instruments. The weight data include sample descriptors, selection probabilities, and replicate weights for the estimation of sampling error. The derived data include sample descriptions from other sources and variables that are derived from the response data for use in analysis or reporting.

For each subject area of the main assessment, the item response data within each block were left in their order of presentation. The blocks, however, were arranged according to the following scheme: common background, subject-related background, the cognitive blocks in ascending numerical order, and student motivation. The responses to cognitive blocks that were not present in a given booklet were left blank, signifying a condition of "missing by design."

In order to process and analyze the spiral sample data effectively, the user must also be able to determine, from a given booklet record, which blocks of item response data were present and their relative order in the instrument. This problem was remedied by the creation of a set of control variables, one for each block, which indicated not only the presence or absence of the block but its order in the instrument. These control variables are included with the derived variables.

8.4.2.3 Data Definition

To enable the data files to be processed on any computer system using any procedural or programming language, it was desirable that the data be expressed in numeric format. This was possible, but not without the adoption of certain conventions for reexpressing the data values.

During creation of the NAEP database, the responses to all multiple-choice items were transcribed and stored in the database using the letter codes printed in the instruments. This scheme afforded the advantage of saving storage space for items with 10 or more response options, but at the expense of translating these codes into their numeric equivalents for analysis purposes. The response data fields for most of these items would require a simple alphabetic-to-numeric conversion. However, the data fields for items with 10 or more response choices would require "expansion" before the conversion, since the numeric value would require two column positions. One of the processing control parameters on the LABELS file indicates whether or not the data field is to be expanded before conversion and output.

The ETS database contained special codes to indicate certain response conditions: "I don't know" responses, multiple responses, omitted responses, not-reached responses, and unresolvable responses, which include out-of-range responses and responses that were missing due to errors in printing or processing. The scoring guides for the mathematics and science constructed-response items included additional special codes for ratings of "illegible," "I don't know," "off task," or non-rateable by the scorers. All of these codes had to be reexpressed in a consistent numeric format.

The following convention was adopted and used in the designation of these codes: The "illegible" response codes were converted to 5; the "off task" response codes were converted to 6; the "I don't know" and non-rateable response codes were converted to 7; the "omitted" response codes were converted to 8; the "not reached" response codes were converted to 9; and the multiple response codes were converted to 0; and. The out-of-range and missing responses were coded as blank fields, corresponding to the "missing by design" designation.

This coding scheme created conflicts for those multiple-choice items that had seven or more valid response options as well as the "I don't know" response and for those constructed-response items whose scoring guide had five or more categories. These data fields were also expanded to accommodate the valid response values and the special codes. In these cases, the special codes were "extended" to fill the output data field: the "I don't know" and non-rateable codes were extended from 7 to 77, omitted response codes from 8 to 88, etc.

Each numeric variable on the secondary-use files was classified as either continuous or discrete. The continuous variables include the weights, proficiency scores, identification codes, and item responses where counts or percentages were requested. The discrete variables include those items for which each numeric value corresponds to a response category. The designation of "discrete" also includes those derived variables to which numeric classification categories have been assigned. The constructed-response items were treated as a special subset of the discrete variables and were assigned to a separate category to facilitate their identification in the documentation.

8.4.2.4 Data File Catalogs

The CATALOG file is created by the GENCAT program from the LABELS file and the 1996 master catalog file. Each record on the LABELS file generates a CATALOG record by first retrieving the master catalog record corresponding to the field name. The master catalog record contains usage, classification, and response code information, along with positional information from the LABELS file: field sequence number, output column position, and field width. Like the LABELS file, the CATALOG file is an intermediate file and is not included on the released data files.

The information for the response codes, also referred to as "foils," consists of the valid data values for the discrete numeric fields, and a 20-character description of each. The GENCAT program uses additional control information from the LABELS file to determine if extra foils should be generated and saved with each CATALOG record. The first flag controls generation of the "I don't know" or non-rateable foil; the second flag regulates omitted or not-reached foil generation; and the third flag denotes the possibility of multiple responses for that field and sets up an appropriate foil. All of these control parameters, including the expansion flag, may be altered in the LABELS file by use of a text editor, in order to control the generation of data or descriptive information for any given field.

The LABELS file supplies control information for many of the subsequent secondary-use data processing steps. The CATALOG file provides detailed information for those and other steps.

8.4.2.5 Data File Layouts

The data file layouts were the first user product to be generated in the secondary-use data files process. The generation program, GENLYT, used a CATALOG file as input and produced a printable file. The LAYOUT file is little more than a formatted listing of the CATALOG file.

Each line of the LAYOUT file contains the following information for a single data field: sequence number, field name, output column position, field width, number of decimal places, data type, value range, key or correct response value, and a short description of the field. The sequence number of each field is implied from its order on the LABELS file. The field name is an 8-character label for the field that is to be used consistently by all secondary-use data files materials to refer to that field on that file. The output column position is the relative location of the beginning of that field on each record for that file, using bytes or characters as the unit of measure. The field width indicates the number of columns used in representing the data values for a field. If the field contains continuous numeric data, the value under the number of decimal places entry indicates how many places to shift the decimal point before processing data values.

The data type category uses five codes to designate the nature of the data in the field: Continuous numeric data are coded "C;" discrete numeric data are coded "D;" constructed-response item data are coded "OS;" if the item was dichotomized for scaling and "OE;" if it was scaled under a polytomous response model. Additionally, the discrete numeric fields that include "I don't know" response codes are coded "DI." If the field type is discrete numeric, the value range is listed as the minimum and maximum permitted values separated by a hyphen to indicate range. If the field is a response to a scorable item, the correct option value, or key, is printed; if the field is an assigned score that was scaled as a dichotomous item using cut point scoring, the range of correct scores is printed. Each variable is further identified by a 50-character descriptor.

8.4.2.6 Data Codebooks

The data codebook is a printed document containing complete descriptive information for each data field. Most of this information originates from the CATALOG file; the remaining data comes from the COUNTS file and the IRT parameters file.

Each data field receives at least one line of descriptive information in the codebook. If the data type is continuous numeric, no more information is given. If the variable is discrete numeric, the codebook lists the foil codes, foil labels, and frequencies of each value in the data file. Additionally, if the field represents an item used in IRT scaling, the codebook lists the parameters used by the scaling program.

Certain blocks of cognitive items in the 1996 assessment that are to be used again in later assessments for trend comparisons have been designated as nonreleased. In order to maintain their confidentiality, generic labels have been substituted for the response category descriptions of these items in the data codebooks and the secondary-use files.

The frequency counts are not available on the catalog file, but must be generated from the data. The GENFREQ program creates the COUNTS file using the field name to locate the variable in the database, and the foil values to validate the range of data values for each field. This program also serves as a check on the completeness of the foils in the CATALOG file, as it flags any data values not represented by a foil value and label.

The IRT parameter file is linked to the CATALOG file through the field name. Printing of the IRT parameters is governed by a control flag in the classification section of the CATALOG record. If an item has been scaled for use in deriving the proficiency estimates, the IRT parameters are listed to the right of the foil values and labels, and the score value for each response code is printed to the immediate right of the corresponding frequency.

The LAYOUT and CODEBOOK files are written by their respective generation programs to print-image disk data files. Draft copies are printed and distributed for review before the production copy is generated. The production copy combines the LAYOUT and CODEBOOK files for each sample in a portable document file (PDF) format. This file may be browsed, excerpted and printed using the Adobe Acrobat Reader program on a variety of platforms and operating systems.

8.4.2.7 Control Statement Files for Statistical Packages

An additional requirement of the NAEP cooperative agreement is to provide, for each secondary-use data file, a file of control statements each for the SAS and SPSS statistical systems that will convert the raw data file into the system data file for that package. Two separate programs, GENSAS and GENSPX, generate these control files using the CATALOG file as input.

Each of the control files contains separate sections for variable definition, variable labeling, missing value declaration, value labeling, and creation of scored variables from the cognitive items. The variable definition section describes the locations of the fields, by name, in the file, and, if applicable, the number of decimal places or type of data. The variable label identifies each field with a 50-character description. The missing value section identifies values of those variables that are to be treated as missing and excluded from analyses. The value labels correspond to the foils in the CATALOG file. The code values and their descriptors are listed for each discrete numeric variable. The scoring section is provided to permit the user to generate item score variables in addition to the item response variables.

Each of the code generation programs combines three steps into one complex procedure. As each CATALOG file record is read, it is broken into several component records according to the information to be used in each of the resultant sections. These record fragments are tagged with the field sequence number and a section sequence code. They are then organized by section code and sequence number. Finally, the reorganized information is output in a structured format dictated by the syntax of the processing language.

The generation of the system files accomplishes the testing of these control statement files. The system files are saved for use in special analyses by NAEP staff. These control statement files are included on the distributed data files to permit users with access to SAS and/or SPSS to create their own system files.

8.4.2.8 Machine-Readable Catalog Files

For those NAEP data users who have neither SAS nor SPSS capabilities, yet require processing control information in a computer-readable format, the distribution files also contain machine-readable catalog files. Each machine-readable catalog record contains processing control information, IRT parameters, and foil codes and labels.

8.4.2.9 NAEP Data on Disk

The complete set of secondary-use data files described above are available on CD-ROM as part of the NAEP Data on Disk product suite. This medium can be ideal for researchers and policy makers operating in a personal computing environment.

The NAEP Data on Disk product suite includes two other components which facilitate the analysis of NAEP secondary-use data. The PC-based NAEP data extraction software, NAEPEX, enables users to create customized extracts of NAEP data and to generate SAS or SPSS control statements for preparing analyses or generating customized system files. The NAEP analysis modules, which currently run under SPSS® for Windows™, use output files from the extraction software to perform analyses that incorporate statistical procedures appropriate for the NAEP design.

Chapter 9

OVERVIEW OF PART II: THE ANALYSIS OF 1996 NAEP DATA[1]

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9.1 INTRODUCTION

The purpose of this chapter is to summarize some information from previous chapters that is integral to the analysis of NAEP data, to summarize the analysis steps used for all subjects, and to indicate what information is in each of the remaining chapters. The overview of the analyses conducted on the 1996 NAEP data focuses on the common elements of the analyses used across the subject areas of the assessment. Some of this information is available only within this chapter. Details by subject area are provided in Chapters 12 through 17.

The organization of this chapter is as follows:

- Section 9.2 provides a short overview of the NAEP design for 1996. To provide additional background information, the section also provides a short description of the samples selected for 1996. Chapters 1 through 8 provide this same information in much more detail.

- Section 9.3 summarizes the steps in analysis common to all subject areas. Some of this information is described in more detail in other chapters. The rest is included only within this chapter. The topics covered are as follows:

- Section 9.3.1 briefly describes the preparation of the final sampling weights. Detailed information about the weighting procedures is given in Chapter 10. Detailed information about the sampling design is in Chapter 3.

- Section 9.3.2 provides information about the scoring reliability of constructed-response items. It provides information about the reliability measures used with the NAEP data during analysis. Chapter 7 contains information about the reliability procedures used during the scoring process.

- Section 9.3.3 summarizes the information provided by the teacher questionnaires, and indicates its use during the analysis process.

- Section 9.3.4 provides a description of the item properties examined for background questions and for cognitive items. It includes a description of the classical item statistics examined for both dichotomously and polytomously scored items. It also includes a description of the item-level results available from summary data tables. Chapter 18 contains more information about the conventions used in creating these summary tables. Finally, a thorough description of differential item functioning analyses is provided.

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[1] Nancy L. Allen was responsible for the psychometric and statistical analyses of national and state NAEP data. James E. Carlson was responsible for psychometric and statistical analyses relating to special aspects and issues of NAEP. Eugene G. Johnson, John Mazzeo, Spencer S. Swinton, and Rebecca Zwick also contributed to this chapter.

- Section 9.3.5 summarizes the steps used to scale NAEP data. The steps include IRT scaling of the items, generation of plausible values (conditioning), transforming the results to the final reporting scale, creating composite scores if necessary, and providing tables of reported statistics. Details of the theory behind these steps are available in Chapter 11.
- Section 9.3.6 provides some information about previous results of dimensionality analyses.
- Finally, Section 9.3.7 gives an introduction to hypothesis testing and drawing correct conclusions about NAEP data. Specific information about which hypothesis test procedures were used for different purposes is provided in Chapter 18.
- Section 9.4 contains a description of the information provided in Chapters 10 through 19 of this report.

9.2 SUMMARY OF THE NAEP DESIGN

As described in Chapter 1, the 1996 NAEP comprised three major components. One component encompassed major assessments in mathematics and science, providing detailed information about student proficiency at the fourth-, eighth-, and twelfth-grade levels of nonpublic and public schools. Long-term trend assessments of science, mathematics, and reading at ages 9, 13, and 17, and the long-term trend writing assessment for grades 4, 8, and 11, constituted the second component. The third major component was the State Assessment at the fourth- and eighth-grade levels in mathematics and at the eighth-grade level in science. Technical details of the State Assessments are not included in this report but are presented in the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* (Allen, Jenkins, Kulick, & Zelenak, 1997) and the *Technical Report of the NAEP 1996 State Assessment Program in Science* (Allen, Swinton, Isham, & Zelenak, 1997).

In addition to the three major components, special studies of advanced mathematics students at the eighth- and twelfth-grade levels and advanced science students at the twelfth-grade level were conducted. The results from and procedures used in these special studies are reported in separate documents. Likewise, results from a study of holistic scores for the long-term trend writing task responses are reported in a separate document. Results based on primary trait scores for the same writing tasks are reported in the *NAEP 1996 Trends in Academic Progress* (Campbell, Voelkl, & Donahue, 1997), and the analyses contributing to those results are described in Chapters 14-17 of this document. Finally, results for the items associated with specific mathematics themes are reported elsewhere.

Results from the analyses described in the following chapters were reported in the following reports:

- The *NAEP 1996 Mathematics Report Card for the Nation and the States*, which provides both public- and nonpublic-school data for major NAEP reporting subgroups for all of the jurisdictions that participated in the State Assessment program, as well as selected results from the 1996 national mathematics assessment.

- The *NAEP 1996 Science Report Card for the Nation and the States*, which provides both public- and nonpublic-school data for major NAEP reporting subgroups for all of the jurisdictions that participated in the State Assessment program, as well as selected results from the 1996 national science assessment.

- The *Cross-State Data Compendium for the NAEP 1996 Mathematics Assessment*, which includes jurisdiction-level results for all the demographic, instructional, and experiential background variables included in the *Mathematics Report Card* and *State Reports*.

- The *Cross-State Data Compendium for the NAEP 1996 Science Assessment*, which includes jurisdiction-level results for all the demographic, instructional, and experiential background variables included in the *Science Report Card* and *State Reports*.

- The *NAEP 1996 Trends in Academic Progress*, which looks at trends in average performance over time in the areas of mathematics, science, reading, and writing.

Because the samples of students included in the 1996 NAEP assessment are listed and described in detail in Chapter 1, only a brief description of these samples is given here. The 1996 national samples were of three general types: main NAEP samples, which were based on a common set of assessment procedures, including grade-level samples; long-term trend samples, the purpose of which was to provide links to earlier assessments; and special study samples, used to examine results for advanced mathematics and science students.

To shorten the timetable for reporting results, the period for national main assessment data collection was shortened in 1992, 1994, and 1996 from the five-month period (January through May) used in 1990 and earlier assessments to a three-month period in the winter (January through March, corresponding to the period used for the winter half-sample of the 1990 National Assessment).

The 1996 analyses of long-term trend data extended the trend lines commencing in 1971 in reading, 1973 in mathematics, 1969 in science, and 1984 in writing.

As described in Chapters 1 and 4, for each subject area in the main assessment, blocks of items were used to create a large number of different assessment booklets according to a focused design. The 1996 mathematics assessment used a focused balanced incomplete block (focused-BIB) design while the 1996 science assessment used a more complex design due to the inclusion of blocks of items associated with a specific theme or hands-on performance task. The focused-BIB design provided for booklets that typically included three blocks of cognitive items in a single subject area, as well as background items. The blocks of cognitive items for mathematics and science included both multiple-choice and constructed-response items. In a focused-BIB design, each block of cognitive items appears in the same number of booklets. To balance possible block position main effects, each block appears an equal number of times in each position. In addition, the BIB design requires that each block of items be paired in a booklet with every other block of items exactly once.

9.3 ANALYSIS STEPS

Because the analysis methods are not identical across subject areas or across major national and long-term trend samples, a separate analysis chapter has been included for each major assessment and for each long-term trend assessment. The procedures used depended on whether assessment items were scored dichotomously (right versus wrong) or polytomously (more than two categories of response) and whether links across grade levels were required. Basic procedures common to most or all of the subject area analyses are summarized here. The order is essentially that in which the procedures were carried out.

9.3.1 Preparation of Final Sampling Weights

Because NAEP uses a complex sampling design (Chapter 3) in which students in certain subpopulations have different probabilities of inclusion in the sample, the data collected from each student must be assigned a weight to be used in analyses. The 1996 NAEP weights were provided by Westat, Inc., the NAEP contractor in charge of sampling. Detailed information about the weighting procedures is available in Chapter 10 and in *The 1996 NAEP Sampling and Weighting Report* (Wallace & Rust, 1999).

9.3.2 Reliability of Scoring Constructed-Response Items

A minimum of 25 percent of the responses for science items involved only in the national assessment and six percent of the responses for mathematics and science items involved in both the national and state assessments were scored by a second reader to obtain statistics on interreader (interrater) reliability. Ranges for percentage of exact agreement for state and national assessments, together, of mathematics and science can be found in Table 9-1. Average percentage of exact agreement for each booklet type (spiral and advanced) can be found in Tables 7-5 and 7-6 in Chapter 7. This reliability information was also used by the team leaders to monitor the capabilities of all readers and maintain uniformity of scoring across readers. More information about this use of the reliability information is in Chapter 7.

Table 9-1

1996 Mathematics and Science State and National Assessments
Ranges of Percentage Exact Agreement Among Readers

	Assessment	Number of Unique Items Total	Number of Items in Percentage Exact Agreement Range 70-79%	80-89%	Above 90%
Mathematics					
	4th grade	79	0	11	68
	8th grade	98	1	5	92
	12th grade	96	1	9	86
Science					
	4th grade	94	0	13	81
	8th grade	125	0	20	105
	12th grade	156	0	26	130

In addition to reliability information calculated and used during the scoring process, several additional reliability measures are calculated for constructed-response items after the item response data has been placed on the NAEP database. They appear in Appendix I. These include a final percentage exact agreement, the intraclass correlation, Cohen's Kappa (Cohen, 1968), and the product-moment correlation between the scores for the first and second readers. These measures are summarized in Zwick (1988), Kaplan and Johnson (1992), and Abedi (1996). Each measure has advantages and disadvantages for use in different situations. In this report, the percentage exact agreement is reported for all constructed-response items, Cohen's Kappa is reported for dichotomously scored constructed-response items, and the intraclass correlation is reported for polytomously scored constructed-response items.

9.3.3 Teacher Questionnaires

Teachers of students who were in the fourth- and eighth-grade mathematics and science main assessment samples and twelfth-grade advanced mathematics samples were asked to complete a two-part questionnaire. The first part of the questionnaire pertained to the teacher's background and training (Parts I and IIA in Chapter 2). The second part pertained to the procedures used by the teacher for *specific classes* containing assessed students (Parts IIB I Chapter 2). See Chapter 2 for a description of the teacher questionnaires.

To analyze the data from the teacher questionnaires with respect to the students' data, each teacher's questionnaire had to be matched to all of the sampled students who were taught by that teacher. In the subsequent chapters two separate match rates for each grade are given. The first is the percentage of students that could be matched to both the first and second parts of the teacher questionnaire. For these students, information is available not only about the background and training of their teachers, but also about the methods used in the particular class they attended. The second match rate is the percentage of students that could be matched to the first part of the teacher questionnaire. This match rate is larger because more students could be matched with information about a teacher than with information about the particular class they attended. Note that these match rates only reflect the student-level missing data. They do not reflect the additional missing data due to item-level nonresponse on the part of teachers. Variables derived from the teacher questionnaires were used as reporting variables at the student level and as variables that contributed to conditioning for the appropriate samples.

Teachers of students who were in the grade 4 mathematics main assessment sample were asked to complete a two-part questionnaire. As with the grade 8 teacher questionnaire, the first part pertained to the teacher's background and training. Unlike the grade 8 teacher questionnaire, the second part pertained to only a single class that the teacher taught. In development of the questionnaires, it was thought that fourth-grade teachers would teach one class in each subject. In practice, that was found to be untrue for a number of teachers. A single student-teacher match rate matching students to the first part of the questionnaire is reported for grade 4 in the following chapters.

9.3.4 Analysis of Item Properties: Background and Cognitive Items

The first step in the analysis of the 1996 data was item-level analysis of all instruments. Item analyses were performed separately for each grade or age level on each item in each subject area. Each block of items was analyzed separately, by age or grade, with the total score on the block (including the analyzed item) used as the criterion score for statistics requiring such a score. In the cases where final weights were not available, preliminary weights were used in these preliminary analyses. The item analysis of cognitive items was repeated after scaling of the items was completed. The results for only scaled items using final weights are reported in Chapters 12 through 17.

➪ Background Items

For each NAEP background item, the unweighted and weighted percent of students who gave each response were examined, as well as the percent of students who omitted the item and the percent who did not reach the item. The number of respondents was also tabulated. These preliminary analyses were conducted within age/grade cohorts and within major reporting categories. If unexpected results were found, the item data and the encoding of responses were rechecked.

➪ Cognitive Items

All NAEP cognitive items were subjected to analyses of item properties. These analyses included conventional item analyses and incorporated examinee sampling weights. Item analysis was conducted at the block level so that the "number-correct" scores for students responding to an item, selecting each option of an item, omitting an item, or not reaching an item, is the average number of correct responses for the block containing that item. Because of the inclusion of polytomously scored items in the cognitive instruments, it was necessary to use special procedures for these items. The resulting statistics are analogous to those for the dichotomously scored items, as listed below.

Dichotomously Scored Items. These items were analyzed using standard procedures that result in a report for each item that includes:

- for each option of the item, for examinees omitting and not reaching the item, and for the total sample of examinees:
  - ⇒ the number of examinees,
  - ⇒ the percentage of examinees,
  - ⇒ the mean of number-correct scores for the block in which the item appears, and
  - ⇒ the standard deviation of number-correct scores for the block in which the item appears;
- the percentage of examinees providing a response that was "off-task;"
- p+, the proportion of examinees that received a correct score on the item (ratio of number correct to number correct plus wrong plus omitted);
- Δ, the inverse-normally transformed p+ scaled to mean 13 and standard deviation 4;
- the biserial correlation coefficient between the item and the number-correct scores for the block in which the item appears; and
- the point-biserial correlation coefficient between the item and the number-correct scores for the block in which the item appears.

Polytomously Scored Items. Enhanced procedures were employed for polytomously scored items. Methods parallel to those used for dichotomously scored items resulted in values reported for each distinct response category for the item. Response categories for each item were defined in two ways, one based on the original codes for responses as specified in the scoring rubrics used by the scorers (and the position of the item for which no response was given) and one based on a scoring guide developed by subject area and measurement experts. For example, a constructed-response item with four response categories would initially have seven categories (not-reached, omitted, "off-task," and the four valid response categories). Another set of statistics resulted from mapping the response categories (excluding not-reached) into a new set of categories reflecting the scoring guide for the item. A constructed-response item with ordered categories, for example, would be mapped into a set of integers in a corresponding order. The scoring guide could result in the collapsing of (combining of) some response categories. The response categories, based on the final scoring guide developed by subject area and measurement experts, were used to calculate the polytomously scored item statistics.

The following statistics, analogous to those for dichotomously scored items, were computed:

- the percentage of examinees providing a response that was "off-task;"
- in place of p+, the ratio of the mean item score to the maximum-possible item score was used;
- in place of Δ, the ratio of the mean item score to the maximum-possible item score underwent the same transformation as that used on p+ to get Δ for dichotomously scored items;
- the polyserial correlation coefficient was used in place of the biserial; and
- the Pearson correlation coefficient was used in place of the point-biserial.

➪ Tables of Item-Level Results

Tables were created of the percentages of students choosing each of the possible responses to each item within each of the samples administered in 1996. The results for each item were cross-tabulated against the basic reporting variables such as region, gender, race/ethnicity, public/nonpublic school, and parental education. All percentages were computed using the sampling weights. These tables are referred to as the Test Question section of the electronically delivered summary data tables for each sample (see Chapter 18 for a brief description of summary data tables). In the summary data tables, the sampling variability of all population estimates was obtained by the jackknife procedure used by ETS in previous assessments. Details of these procedures are presented in Chapter 10.

➪ Differential Item Functioning Analysis of Cognitive Items

Differential item functioning (DIF) analysis refers to procedures to assess whether items are differentially difficult for different groups of examinees. DIF procedures typically control for overall between-group differences on a criterion, usually by matching examinees from the two groups on overall test scores. Between-group performance on each item is then compared within sets of examinees having the same total test scores.

DIF analyses were conducted for items in the main assessments in mathematics and science that had not previously been studied for differential item functioning. Each set of analyses involved three reference group/focal group comparisons: male/female, White/Black, and White/Hispanic.

The DIF analyses of the dichotomous items were based on the Mantel-Haenszel chi-square procedure, as adapted by Holland and Thayer (1988). The procedure tests the statistical hypothesis that the odds of correctly answering an item are the same for two groups of examinees that have been matched on some measure of proficiency (usually referred to as the matching criterion). The DIF analyses of the polytomous items were based on the Mantel procedure (Mantel, 1963). These procedures compare proportions of matched examinees from each group in each polytomous item response category. The groups being compared are often referred to as the focal group (usually a minority or other group of interest, such as Black examinees or female examinees) and the reference group (usually White examinees or male examinees).

For both types of analyses, the measure of proficiency used is typically the total item score on some collection of items. Since, by the nature of the BIB design, booklets comprise different combinations of blocks, there is no single set of items common to all examinees. Therefore, for each student, the measure of proficiency used was the total item score on the entire booklet. These scores were then pooled across booklets for each analysis. This procedure is described by Allen and Donoghue (1994, 1996). In addition, because research results (Zwick & Grima, 1991) strongly suggest that sampling weights should be used in conducting DIF analyses, the weights were used.

For each dichotomous item in the assessment, an estimate of the Mantel-Haenszel common odds-ratio, expressed on the ETS delta scale for item difficulty, was produced. The estimates indicate the difference between reference group and focal group item difficulties (measured in ETS delta scale units), and typically run between about +3 and -3. Positive values indicate items that are differentially easier for the focal group than the reference group after making an adjustment for the overall level of proficiency in the two groups. Similarly, negative values indicate items that are differentially harder for the focal group than the reference group. It is common practice at ETS to categorize each item into one of three categories (Petersen, 1988): "A" (items exhibiting no DIF), "B" (items exhibiting a weak indication of DIF), or "C" (items exhibiting a strong indication of DIF). Items in category "A" have Mantel-Haenszel common odds ratios on the delta scale that do not differ significantly from 0 at the alpha = .05 level or are less than 1.0 in absolute value. Category "C" items are those with Mantel-Haenszel values that are significantly greater than 1 and larger than 1.5 in absolute magnitude. Other items are categorized as "B" items. A plus sign (+) indicates that items are differentially easier for the focal group; a minus sign (-) indicates that items are differentially more difficult for the focal group.

The ETS/NAEP DIF procedure for polytomous items uses the Mantel-Haenszel ordinal procedure. The summary tables of identified polytomous items contain generalizations of the dichotomous "A," "B," and "C" categories: "AA," "BB," or "CC."

All analyses used rescaled sampling weights. A separate rescaled weight was defined for each comparison as

$$\textit{Rescaled Weight} = \textit{Original Weight} \times \frac{\textit{Total Sample Size}}{\textit{Sum of the Weights}}$$

where the total sample size is the total number of students for the two groups being analyzed (e.g., for the White/Hispanic comparison, the total number of White and Hispanic examinees in the sample at that grade), and the sum of the weights is the sum of the sampling weights of all the students in the sample for the two groups being analyzed. Three rescaled weights were computed for White examinees—one for the gender comparison and two for the race/ethnicity comparisons. Two rescaled overall weights were computed for the Black and Hispanic examinees—one for the gender comparison and another for the appropriate race/ethnicity comparison. The rescaled weights were used to ensure that the sum of the weights for each analysis equaled the number of students in that comparison, thus providing an accurate basis for significance testing.

In the calculation of total item scores for the matching criterion, both not-reached and omitted items were considered to be wrong responses. Polytomous items were weighted more heavily in the formation of the matching criterion, proportional to the number of score categories. For each item, calculation of the Mantel-Haenszel statistic did not include data from examinees who did not reach the item in question.

Each DIF analysis was a two-step process. In the initial phase, total item scores were formed, and the calculation of DIF indices was completed. Before the second phase, the matching criterion was refined by removing all "C" or "CC" items, if any, from the total item score. The revised score was used in the final calculation of all DIF indices. Note that when analyzing an item classified as "C" or "CC" in the initial phase, that item score is added back into the total score for the analysis of that item only.

Following standard practice at ETS for DIF analyses conducted on final forms, all "C" or "CC" items were reviewed by a committee of trained test developers and subject-matter specialists. Such committees are charged with making judgments about whether or not the differential difficulty of an item is *unfairly* related to group membership. The committee assembled to review NAEP items included both ETS staff and outside members with expertise in the field. The committee carefully examined each identified item to determine if either the language or contents would tend to make the item more difficult for an identified group of examinees. It was the committee's judgment that none of the "C" or "CC" items in the national assessment were functioning differentially due to factors irrelevant to test objectives. Hence, none of the items were removed from scaling due to differential item functioning. As pointed out by Zieky (1993):

> It is important to realize that *DIF* is not a synonym for *bias*. The item response theory based methods, as well as the Mantel-Haenszel and standardization methods of DIF detection, will identify questions that are not measuring the same dimension(s) as the bulk of the items in the matching criterion....Therefore, judgment is required to determine whether or not the difference in difficulty shown by a DIF index is *unfairly* related to group membership. The judgment of fairness is based on whether or not the difference in difficulty is believed to be related to the construct being measured....The fairness of an item depends directly on the purpose for which a test is being used. For example, a science item that is differentially difficult for women may be judged to be fair in a test designed for certification of science teachers because the item measures a topic that every entry-level science teacher should know. However, that same item, with the same DIF value, may be judged to be unfair in a test of general knowledge designed for all entry-level teachers. (p. 340)

9.3.5 Scaling

Scales based on item response theory (IRT) were derived for each subject area. A single scale was used for summarizing long-term trends at each age or grade level in each of the subject areas. Five scales were created for mathematics main assessment data, one for each mathematics content strand, and three scales were created for science data, one for each field of science. NAEP uses the methodology of multiple imputations (plausible values) to estimate characteristics of the proficiency distributions.

Chapter 11 describes in detail the theoretical underpinnings of NAEP's scaling methods and the required estimation procedures. The basic analysis steps are outlined here.

1. Use the NAEP-BILOG/PARSCALE computer program (described in Chapter 11) to estimate the parameters of the item response functions on an arbitrary provisional scale. This program uses an IRT model incorporating the two- and three-parameter logistic forms used in previous assessments for dichotomously scored items and the generalized partial credit form for polytomously scored items. In order to select starting values for the iterative parameter-estimation procedure for each dataset, the program is first run to convergence, imposing the condition of a fixed normal prior distribution of the proficiency variable. Once these starting values are computed, the main estimation runs model ability as a multinomial distribution. That is, no prior assumption about the shape of the proficiency distribution is made. In analyses involving more than one population, estimates of parameters are made with the overall mean and standard deviation of all subjects' proficiencies specified to be 0 and 1, respectively.

2. Use a version of the MGROUP program (described in Chapter 11), which implements the method of Mislevy (see Chapter 11 or Mislevy, 1991) to estimate predictive proficiency distributions for each student on an arbitrary scale, based on the item parameter estimates and the student's responses to cognitive items and background questions.

3. Use random draws from these predictive proficiency distributions (plausible values, in NAEP terminology) for computing the statistics of interest, such as mean proficiencies for demographic groups.

4. Determine the appropriate metric for reporting the results and transform the results as needed. This includes the linking of current scales to scales from the past or the selection of the mean and variance of new scales. After proficiency distributions for the scaling are transformed, composite proficiency distributions are created for the mathematics and science assessments.

5. Use the jackknife procedure to estimate the standard errors of the mean proficiencies for the various demographic groups.

As explained in Chapter 11, the plausible values obtained through the IRT approach are not optimal estimates of individual proficiency; instead, they serve as intermediate values to be used in estimating subpopulation characteristics. Under the assumptions of the scaling models, these subpopulation estimates are statistically consistent, which would not be true of subpopulation estimates obtained by aggregating optimal estimates of individual proficiency.

➪ Scaling the Cognitive Items

The data from both the trend and the main assessment samples were scaled using IRT models. For dichotomously scored items two- and three-parameter logistic forms of the model were used, while for polytomously scored items the generalized partial credit model form was used. These two types of items and models were combined in the NAEP scales. Item parameter estimates on a provisional scale were obtained using the NAEP BILOG/PARSCALE program. The fit of the IRT model to the observed data was examined within each scale by comparing the empirical item response functions with the theoretical curves, as described in Chapter 11. Plots of the empirical item response functions and theoretical curves were compared across assessments for long-term trend assessments. The DIF analyses previously described provide information related to the model fit across subpopulations.

Long-Term Trend Scaling. Item parameters for science, mathematics, reading, and writing trends were reestimated, separately for each age or age/grade group using the data from the 1994 assessment as well as data from the 1996 assessment. The resulting scales, based on these reestimated item parameters, were then linked to the existing long-term trend scales.

Main Assessment Scaling. The main assessments of mathematics and science both have special characteristics that determine the procedures that were followed for the scaling and of each subject. For mathematics, a key consideration was the degree of similarity between the 1996 assessment and earlier assessments in terms of the populations assessed and the characteristics of the assessment instrument used. This was due to the fact that the mathematics scales were linked to existing mathematics scales. For science, characteristics of items associated with particular themes and hands-on performance tasks were of concern. The science scales were not linked to any previously defined scales.

The frameworks for the different subject areas dictate differences in the numbers of scales. For mathematics and science, item parameter estimation was performed separately for each of several scales defined in their frameworks, using data from each age/grade sample separately.

Generation of Plausible Values for Each Scale

After the scales were developed, plausible values were drawn from the predictive distribution of proficiency values for each student (this process is called *conditioning*). For the long-term trend scales, the plausible values were computed separately for each age or age/grade group and year, and were based on the student's responses to the items going into the scale as well as on the values of a set of background variables that were important for the reporting of proficiency scores. For the mathematics and science main scales, vectors of multivariate plausible values were drawn from the joint distribution of proficiency values for the assessed student. These multivariate plausible values were computed separately for each grade and reflected the dependency between scale proficiencies by utilizing shared variation among the scales. All plausible values were later rescaled to the final scale metric using appropriate linear transformations.

The variables used to calculate plausible values for a given main assessment scale or group of scales included a broad spectrum of background, attitude, and experiential variables and composites of such variables. All standard reporting variables were included. To enhance numerical stability for the main assessment scales, the original background variables were standardized and transformed into a set of linearly independent variables by extracting principal components from the correlation matrix of the original contrast variables. The principal components, rather than the original variables, were used as independent variables to calculate plausible values for those scales. Trend scales used the same or similar sets of conditioning variables that were used when the scales were originally constructed. Details of the conditioning process and of the NAEP-BGROUP and NAEP-CGROUP computer programs that implement the process are presented in Chapter 11.

Transformation to the Reporting Metric

Mathematics short-term trend and science, mathematics, reading, and writing long-term trend scales were linked to previous assessment scales via common population linking procedures described in the subject-specific data analysis chapters. Essentially, the 1994 and 1996 data were calibrated together. Data from the two assessments were scaled together in the same BILOG/PARSCALE run, specifying the samples for each assessment as coming from different populations. For each scale, the mean and standard deviation of the 1994 data from this joint calibration were matched to the mean and standard deviation of the 1994 data as previously reported. This then linked the 1996 data to the previously established scale. New scales were established for the science main assessment. Then the metrics for the newly established science scales were set to have a mean of 150 and a standard deviation of 35.

The transformations were of the form

$$\theta_{target} = A \bullet \theta_{calibrated} + B$$

where

θ_{target} = scale level in terms of the system of units of the final scale used for reporting;

$\theta_{calibrated}$ = scale level in terms of the system of units of the provisional NAEP-BILOG/PARSCALE scale;

A = $SD_{target} / SD_{calibrated}$;

B = $M_{target} - A \bullet M_{calibrated}$;

SD_{target} = the estimated or selected standard deviation of the proficiency distribution to be matched;

$SD_{calibrated}$ = the estimated standard deviation of the sample proficiency distribution on the provisional NAEP-BILOG/PARSCALE scale;

M_{target} = the estimated or selected mean of the proficiency distribution to be matched; and

$M_{calibrated}$ = the estimated mean of the sample proficiency distribution on the provisional NAEP-BILOG/PARSCALE scale.

After the plausible values were linearly transformed to the new scale, any plausible value less than 0 was censored to 0. For all 1996 assessments other than the science main assessment, any value greater than 500 was censored to 500; for the science main assessment, any value greater than 300 was censored to 300. Fewer than 1 percent of the students in any sample were censored in this way. The final transformation coefficients for transforming each provisional scale to the final reporting scale are given in subsequent chapters.

Definition of Composites for the Multivariate Scales

In addition to the plausible values for each scale, composites of the individual mathematics and science main assessment scales were created as measures of overall proficiency within these subject areas. These composites were weighted averages of the plausible values of the individual scales. The weights reflected the relative importance of the scales and were provided in the frameworks developed by the subject area committees. The weights are approximately proportional to the number of items in each scale at a given grade level.

Tables of Proficiency Means and Other Reported Statistics

Proficiencies and trends in proficiencies were reported by age or grade for a variety of reporting categories. Additionally, for the main assessments, the percentages of the students within each of the reporting groups who were at or above achievement levels were reported to provide information about the distribution of achievement within each subject area. For the long-term trend assessments, the percentages of the students within each of the reporting groups who were at or above anchor points were reported for the same reason. All estimates based on proficiency values have reported variances or standard errors based on proficiency values including the error component due to the latency of proficiency values of individual students as well as the error component due to sampling variability. These tables are part of the electronically delivered summary data tables.

9.3.6 Dimensionality Analysis

Over the years a number of studies have been conducted in order to seek answers to the question of how many dimensions underlie the various NAEP assessment instruments, and whether there is a sufficiently strong first dimension to support inferences about a composite scale in subjects such as mathematics, science, and reading. In addition, for the 1992 mathematics and reading assessments, a study was conducted (Carlson, 1993) to determine whether the increasing emphasis on extended constructed-response items that are scored polytomously has any effect on the dimensionality. It was determined that for the 1992 NAEP data, item type was not related to any of the dimensions identified.

Previous Dimensionality Analyses of NAEP Data

In an early study, NAEP reading assessment data collected during the 1983-84 academic year was examined for dimensionality by Zwick (1986, 1987). Zwick also studied simulated data designed to mirror the NAEP reading item-response data but having known dimensionality. Analysis of the simulated datasets allowed her to determine whether the BIB spiraling design artificially increases dimensionality. Zwick found substantial agreement among various statistical procedures, and that the results using BIB spiraling were similar to results for complete datasets. Overall she concluded that "it is not unreasonable to treat the data as unidimensional (1987, p. 306)."

Rock (1991) studied the dimensionality of the NAEP mathematics and science tests from the 1990 assessment using confirmatory factor analysis. His conclusion was that there was little evidence for discriminant validity except for the geometry scale at the eighth-grade level, and that "we are doing little damage in using a composite score in mathematics and science (p. 2)."

A second-order factor model was used by Muthén (1991) in a further analysis of Rock's mathematics data, to examine subgroup differences in dimensionality. Evidence of content-specific variation within subgroups was found, but the average (across seven booklets) percentages of such variation was very small, ranging from essentially 0 to 22, and two-thirds of these percentages were smaller than 10.

Carlson and Jirele (1992) examined 1990 NAEP mathematics data. Analyses of simulated one-dimensional data were also conducted, and the fit to these data was slightly better than that to the real NAEP data. Although there was some evidence suggesting more than one dimension in the NAEP data, the strength of the first dimension led the authors to conclude that the data "are sufficiently unidimensional to support the use of a composite scale for describing the NAEP mathematics data, but that there is evidence that two dimensions would better fit the data than one (p. 31)."

Carlson (1993) studied the dimensionality of the 1992 mathematics and reading assessments. The relative sizes of fit statistics for simulated as compared to actual data suggested that lack of fit may be more due to the BIB spiraling design of NAEP than the number of dimensions fitted. Kaplan (1995) similarly found that the chi-squared goodness of fit statistic in the maximum likelihood factor analysis model was inflated when data were generated using a BIB design. The sizes of the fit statistics for incomplete simulation conditions (a BIB design as in the actual NAEP assessment) were more like those of the real data than were those of the case of simulation of a complete data matrix. Consistent with findings of Zwick (1986, 1987), however, the incomplete design for data collection used in NAEP does not appear to be artificially inflating the number of dimensions identified using these procedures.

9.3.7 Drawing Inferences from the Results

Drawing correct inferences from the results of the assessments depends on several components. First, the hypothesis of no difference between groups must be tested statistically. For the 1996 assessment, the use of t-tests was introduced for most comparisons. These tests are more appropriate than z-tests based on normal distribution approximations when the statistics that are being compared are from distributions with thicker tails than those from the normal distribution. The statistical significance tests used in NAEP are described in detail in Chapter 18.

A second component contributing to drawing correct inferences is the way in which error rates are controlled when multiple comparisons are made. If we wish to make a number of comparisons in the same analysis, say White students versus Black, Hispanic, Asian/Pacific Island, and American Indian students, the probability of finding "significance" by chance for at least one comparison increases with the family size or number of comparisons. By the Bonferroni inequality, for a family size of 4, for example, the probability of a false positive (Type I error) using $\alpha = .05$ is less than or equal to $4 \times .05 = .20$, larger than most decision-makers would accept.

One general method for controlling error rates in multiple comparisons is based on the Bonferroni inequality. In this method, the Bonferroni inequality is applied and α is divided by the family size, n. Now $\alpha = .05/4 = .0125$, and using α, the combined probability of one or more errors in the four comparisons remains controlled at less than or equal to .05. Note that dividing the probability by n is not the same as multiplying the critical value or the confidence band by n. Indeed, in moving from a family size of 1 to 4, we increase the critical value only from 1.960 to 2.498, a 27.4 percent increase. Doubling the family size again, to 8, increases the critical value to 2.735, an additional 9.5 percent increase. To double the initial critical value to 3.92, the family size would have to be increased to 564.

The power of the tests thus depends on the number of comparisons planned. There may be cases for which, before the data are seen, it is determined that only certain comparisons will be conducted. As an example, with the five groups above, interest might lie only in comparing the first group with each of the others (family size 4), rather than comparing all possible pairs of groups (family size 10). This means that some possibly significant differences will not be found or discussed, but the planned comparisons will have greater power to identify real differences when they occur.

In 1996, several other methods were used to increase the power of statistical tests. For cases where comparisons of statistics in 2 × 2 tables were made, an adapted Bonferroni procedure varying the family size for each consecutive test was used (Hochberg, 1988). For a very large number of comparisons, as when comparing results for every state to the nation, a different criterion was used to control the error rates due to the large number of comparisons. This criterion, the False Discovery Rate (FDR), as described by Benjamini and Hochberg (1994), contrasts with the Familywise Error Rate (FWE) criterion used in the Bonferroni method. For trends extending over several administrations, power is gained by testing least-squares fitted linear and quadratic trends, rather than individual pairs of data points. For example, if the linear regression coefficient is significantly greater than 0, and the quadratic coefficient is not different from 0, the trend over time is positive, even though the Bonferroni test might declare no individual pair of points significantly different. These ways to control error rates in multiple comparisons are described in Chapter 18.

A third component contributing to drawing correct inferences is the limitation of comparisons to those for which there are adequate data. In NAEP reports and data summaries, estimates of quantities such as composite and content area proficiency means, percentages of students at or above the achievement levels, and percentages of students indicating particular levels of background variables (as measured in the student, teacher, and school questionnaires) are reported for the total population as well as for key subgroups determined by the background variables. In some cases, sample sizes were not large enough to permit accurate estimation of proficiency and/or background variable results for one or more of the categories of these variables.

For results to be reported for any subgroup, a minimum sample size of 62 was required. This number was arrived at by determining the sample size required to detect an effect size of 0.5 with a probability of .8 or greater.[2] The effect size of 0.5 pertains to the "true" difference in mean proficiency between the subgroup in question and the total population, divided by the standard deviation of proficiency in the total population. In addition, subgroup members must represent at least five primary sampling units (PSUs).

A fourth component contributing to drawing correct inferences is the limitation of comparisons to those comparing statistics with standard errors that are estimated well. Standard errors of mean proficiencies, proportions, and percentiles play an important role in interpreting subgroup results and comparing the performances of two or more subgroups. The jackknife standard errors reported by NAEP are statistics whose quality depends on certain features of the sample from which the estimate is obtained. In certain cases, typically when the number of students upon which the standard error is based is small or when this group of students all come from a small number of participating schools, the mean squared error associated with the estimated standard errors may be quite large. In the summary reports, estimated standard errors subject to large mean squared errors are followed by the symbol "!".

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[2] A design effect of 2 was assumed for this purpose, implying a sample design-based variance twice that of simple random sampling. This is consistent with previous NAEP experience (Johnson & Rust, 1992).

The magnitude of the mean squared error associated with an estimated standard error for the mean or proportion of a group depends on the coefficient of variation (*CV*) of the estimated size of the population group, denoted as *N*. This coefficient of variation is estimated by:

$$CV(\hat{N}) = \frac{SE(\hat{N})}{\hat{N}}$$

where $\hat{N}$ is a point estimate of *N* and $SE\left(\hat{N}\right)$ is the jackknife standard error of $\hat{N}$.

Experience with previous NAEP assessments suggests that when this coefficient exceeds 0.2, the mean squared error of the estimated standard errors of means and proportions based on samples for this group may be quite large. Therefore, the standard errors of means and proportions for all subgroups for which the coefficient of variation of the population size exceeds 0.2 are followed by "!" in the tables of all summary reports. These standard errors, and any confidence intervals or significance tests involving these standard errors, should be interpreted with caution. (Further discussion of this issue can be found in Johnson & Rust, 1992.)

A final component contributing to drawing correct inferences pertains to comparisons involving extreme proportions. When proportions are close to zero or one, their distributions differ greatly from t- or z-distributions. For this reason, hypothesis tests of the sort used by NAEP are not appropriate in these cases. Under these conditions, no test is made. Chapter 18 includes the specific definition of extreme proportion used in the analysis of 1996 data.

9.4 OVERVIEW OF CHAPTERS 10 THROUGH 19

The remaining chapters in Part II of this report are as follows:

Chapter 10: The 1996 National Assessment used a stratified multistage probability sampling design that provided for sampling certain subpopulations at higher rates (see Chapter 3). Because probabilities of selection are not the same for all assessed students, sampling weights must be used in the analysis of NAEP data. Also, in NAEP's complex sample, observations are not independent. As a result, conventional formulas for estimating the sampling variance of statistics are inappropriate. Chapter 10 describes the weighting procedures and methods for estimating sampling variance that are necessitated by NAEP's sample design. Further detail on sampling and weighting procedures is provided in *The 1996 NAEP Sampling and Weighting Report,* published in 1999 by Westat, Inc., the NAEP contractor in charge of sampling.

Chapter 11: A major NAEP innovation introduced by ETS is the reporting of subject-area results in terms of IRT-based scales. Scaling methods can be used to summarize results even when students answer different subsets of items. For purposes of summarizing item responses, NAEP developed a scaling technique that has its roots in IRT and in the theories of imputation of missing data. Chapter 11 describes this scaling technique, the underlying theory, and the application of these methods to 1996 NAEP data. The final section of Chapter 11 gives an overview of the NAEP scales that were developed for the 1996 assessment.

Chapter 12: The main short-term trend component of the 1996 mathematics analysis is described in this chapter. A detailed analysis of the main assessment of mathematics was conducted for grades 4, 8, and 12, including a study of the association between mathematics proficiency and student background variables. The results from this component of the analysis can be compared with results from the 1992 mathematics analysis to examine short-term trends. At grades 8 and 12, background information and data on instructional methods were collected from teachers and the relation of these variables to mathematics proficiency was examined. The main assessment analyses are reported in *NAEP 1996 Mathematics Report Card for the Nation and the States* (Reese, Miller, Mazzeo, & Dossey, 1997). A special study of advanced eighth- and twelfth-grade mathematics students was conducted, and cognitive item responses associated with specific mathematics themes for the main mathematics samples was studied.

Chapter 13: The main assessment analysis of the science data is detailed in Chapter 13. This analysis included a study of the association of science knowledge with instructional techniques and student background variables. At grade 8, background information and data on instructional methods were collected from teachers and the relation of these variables to science proficiency was examined. The science results appear in *NAEP 1996 Science Report Card for the Nation and the States* (O'Sullivan, Reese, & Mazzeo, 1997). A special study of advanced twelfth-grade science students was also conducted.

Chapter 14: The reading trend results for the years 1971 through 1994 were extended to include 1996 at ages 9, 13, and 17. The results of the reading trend analysis, which include the percentages of students at or above the reading scale anchor points established in 1984, are reported in *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997).

Chapter 15: The long-term trend assessment analysis of the mathematics data is detailed in Chapter 15. The results of the trend analysis, which provided links from 1973 through 1996 for ages 9, 13, and 17, are reported in *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997).

Chapter 16: The long-term trend assessment analysis of the science data is described in Chapter 16. The science trend results, which provide a link to 1970, 1973, 1977, 1982, 1986, 1990, 1992, and 1994 are reported in *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997).

Chapter 17: Like the 1996 reading assessment, the writing assessment in 1996 consisted of only one component, a long-term trend. The writing trend results, which provide a link to 1984, 1988, 1990, 1992, and 1994 for grades 4, 8, and 12, are reported in *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997).

Chapter 18: The 1996 assessment analyses included changes in the methods, procedures, and conventions used in making group comparisons. Chapter 18 highlights these changes and provides details about which results were reported.

Chapter 19: This chapter presents basic data from the 1996 assessment, including the properties of the measuring instruments and characteristics of the sample.

Chapter 10

WEIGHTING PROCEDURES AND ESTIMATION OF SAMPLING VARIANCE[1]

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10.1 INTRODUCTION

As was the case in previous assessments, the 1996 national assessment used a complex sample design with the goal of securing a sample from which estimates of population and subpopulation characteristics could be obtained with reasonably high precision (as measured by low sampling variability). At the same time, it was necessary that the sample be economically and operationally feasible to obtain. The resulting sample had certain properties that had to be taken into account to ensure valid analyses of the data from the assessment.

The 1996 NAEP sample was obtained through a stratified multistage probability sampling design that included provisions for sampling certain subpopulations at higher rates (see Chapter 3). To account for the differential probabilities of selection, and to allow for adjustments for nonresponse, each student was assigned a sampling weight. Section 10.2 discusses the procedures used to derive these sampling weights.

Another consequence of the NAEP sample design is its effect on the estimation of sampling variability. Because of the effects of cluster selection (students within schools, schools within primary sampling units) and because of the effects of certain adjustments to the sampling weights (nonresponse adjustment and poststratification), observations made on different students cannot be assumed to be independent of one another. In particular, as a result of clustering, ordinary formulas for the estimation of the variance of sample statistics, based on assumptions of independence, will tend to underestimate the true sampling variability. Section 10.3 discusses the jackknife technique used by NAEP to estimate sampling variability. (The estimation of variability due to imperfect measurement of individual proficiency is discussed in Chapter 11.)

The jackknife technique provides good quality estimates of sampling variability but requires considerable computations. Section 10.4 suggests the use of design effects, combined with conventional variance estimation formulas, as a simple approximation to sampling variability estimation.

Since the sample design determines the derivation of the sampling weights and the estimation of sampling variability, it will be helpful to note the key features of the 1996 NAEP sample design. A description of the design appears in Chapter 3, and the various assessment instruments are detailed in Chapter 4.

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[1] Keith F. Rust, and Leslie Wallace were responsible for the design and implementation of the weighting process for the 1996 NAEP assessments. Previous versions of this chapter were created with the significant contributions of Eugene Johnson, Educational Testing Service. Jiahe Qian of Educational Testing Service made significant contributions to the sampling variability sections of this chapter. The statistical programming for this chapter was overseen by Bruce Kaplan and provided by Phillip Leung.

The 1996 sample was a multistage probability sample consisting of four stages of selection for the long-term trend samples and five stages of selection for the main samples. The first stage of selection, the primary sampling units (PSUs), consisted of counties or groups of counties. The second stage of selection consisted of elementary and secondary schools. For the long-term trend assessment, the assignment of sessions to sampled schools comprised the third stage of sampling, and the fourth stage involved the selection of students within schools and their assignment to sessions. For the main assessment, the assignment of schools to sample type (see Chapter 3) comprised the third stage of sampling, the assignment of sessions to sampled schools comprised the fourth stage of sampling, and the fifth stage involved the selection of students within schools and their assignment to sessions.

The probabilities of selection of the first-stage sampling units were proportional to measures of their size, while the probabilities for subsequent stages of selection were such that the overall probabilities of selection of students were approximately uniform, with exceptions for certain subpopulations that were oversampled by design. For the main assessment, schools with relatively high concentrations of Black students and/or Hispanic students were deliberately sampled at twice the normal rate to obtain larger samples of respondents from those subpopulations, in order to increase the precision in the estimation of the characteristics of these subpopulations. Also for the main assessment, nonpublic school students were sampled at three times the normal rate, again to increase the precision of estimates for this population subgroup. For all assessment components, students from schools with smaller numbers of eligibles received lower probabilities of selection, as a means of enhancing the cost efficiency of the sample.

The 1996 main assessment includes three student cohorts: students in grades 4, 8, and 12. The main assessment of all grades was conducted in the spring of 1996 to provide a cross-sectional view of students' abilities in mathematics and science.

The 1996 assessment also included a number of additional samples that used the age definitions, times of testing, and modes of administration used in previous assessments. These are referred to as long-term trend samples. The purpose of these samples was to provide the statistical linkage between the 1996 data and data from previous assessments. The long-term trend assessment represents two overlapping samples of students, the first of specified grades (of any age) and the second of specified ages (in any grade). Students were age-eligible if they were born in the appropriate year (1986, 1982, or October 1978 to September 1979). The corresponding grades for the long-term trend assessment were 4, 8, and 11. Each student cohort is called an "age class."

The full 1996 NAEP assessment thus includes a number of different samples from several populations. Each of these samples has its own set of weights that are to be used to produce estimates of the characteristics of the population addressed by the sample (the target population). Each main sample has an additional set of weights to accommodate the reporting requirements. The various samples and their target populations are as follows:

The Main Samples of Students. The target population for each of these samples (one for each grade) consisted of all students who were in the specified grade and were deemed assessable by their school. There were four distinct session types at grade 4 (mathematics, science, mathematics estimation, and mathematics theme), five at grade 8 (mathematics, science, mathematics estimation, mathematics theme, advanced mathematics), and six at grade 12 (mathematics, science, mathematics estimation, mathematics theme, advanced mathematics, and advanced science). Each session type was conducted as one or more distinct sessions within a school. Administration of each session type was always conducted separately from other session types.

To facilitate analyses, two kinds of weights were produced. "Reporting weights" were produced separately by grade and assessment type for analyses of the reporting samples that were defined for each assessment. Several of the reporting samples included students from multiple sample types. "Modular weights" were produced separately by grade, assessment type, and sample type, for analyses involving any one sample type, or for comparing one sample type with another. Thus in total, across grades, session types, and sample types, there were 15 sets of reporting weights and 32 sets of modular weights for students in the main assessment.

Long-Term Trend Samples for Reading and Writing. These consist of samples comparable to the 1984 main assessment and address the subject areas of reading and writing. The samples were collected by grade and age for age 9/grade 4, age 13/grade 8, and age 17/grade 11, using the age definitions and time of testing from 1984. As in that assessment, print administration was used. Six assessment booklets were administered at each age class. The respondents to the combined set of assigned booklets at a given age class constitute a representative sample of the population of students who were in the specified grade *or* of the specified age. The respondents to any one of the booklets also constitute a representative sample.

Long-Term Trend Samples for Mathematics and Science. These consist of samples comparable to those used for the measurement of trends in 1986. The samples were collected by age only and using the same age definitions and time of testing as in the long-term trend assessment in 1986. As in that assessment, the administration of mathematics and science questions was paced with an audiotape. For ages 9 and 13, three assessment booklets were administered to each age group while two booklets were administered at age 17. The respondents to any one of the booklets assigned to a given age constitute a representative sample of the population of all students of that age. Each booklet was administered in a separate assessment session, but the booklets were combined for weighting and reporting.

For purposes of sampling and weighting, the assessment samples are categorized as "tape-administered" or "print-administered" according to if paced audiotapes were used in the administration:

1. *Tape-administered samples* are samples that required audiotape pacing in the assessment (the long-term trend assessments in mathematics and science). For these samples, all students within a particular assessment session received the same booklet and were paced through at least part of the booklet with an audiotape.

2. *Print-administered samples* are all main assessment samples and the long-term trend assessments of reading and writing. For these samples, no audiotape pacing was employed and the assessment booklets were spiraled through each assessment session (that is, the different booklets that were part of a given session type were systematically interspersed and assigned for testing in that order).

10.2 DERIVATION OF THE SAMPLE WEIGHTS

As indicated previously, NAEP uses differential sampling rates, deliberately oversampling certain subpopulations to obtain larger samples of respondents from those subgroups, thereby enhancing the precision of estimates of characteristics of these oversampled subgroups. As a result of the oversampling, these subpopulations, corresponding to students from schools with high concentrations of Black and/or Hispanic students, and from nonpublic schools, are overrepresented in the sample. Lower sampling rates were introduced also for very small schools (those schools with only 1 to 19 eligible students). This reduced level of sampling from small schools was undertaken in an approximately optimum manner as a means of reducing variances per unit of cost (since it is relatively costly to administer assessments in these small schools). Appropriate estimation of population characteristics must take disproportionate representation into account. This is accomplished by assigning a weight to each respondent, where the weights approximately account for the sample design and reflect the appropriate proportional representation of the various types of individuals in the population.

Two sets of weights were computed for the 1996 main samples for each session type. "Modular weights" were computed for analyses involving students in one sample type, or for comparing results between sample types. Each assessment type by grade and sample type weights up separately to the target population. "Reporting weights" were computed for analyses of the reporting samples defined in Table 10-1. Many of the reporting samples include students from more than one sample type. For reporting samples that include only one sample type (i.e., science), the reporting weights are identical to the modular weights. The steps for computing these two sets of weights are identical, up to and including the step of "trimming" the weights. The trimmed weights were poststratified separately by sample type to create the modular weights. In a parallel procedure, the trimmed weights were scaled back using a "reporting factor" so that the sample types included in each reporting sample, when combined, would weight up to the target population. The resulting weights were poststratified (but not separately by sample type) to create the reporting weights.

Table 10-1

Reporting Samples for the 1996 Main NAEP Samples

Assessment Type	Grade	Reporting Sample[1]
Mathematics	All	A1 + A2 + B1
Science	All	A2 + B2
Mathematics Estimation	4 or 8	A1 + B1[2]
	12	A1 + A2 + B1[2]
Mathematics Theme	All	A2 + B2[3]
Advanced Mathematics	8	A2 + A3 + B2
	12	A3 + B3
Advanced Science	12	A2 + B2

[1] A indicates assessed non SD/LEP students. B indicates assessed SD/LEP students; and 1, 2, or 3 indicates the sample type (see Chapter 3).

[2] In the actual data analysis, the 1996 Mathematics Estimation used the reporting samples of A1 + A3 + B1 for 4th and 8th grades, and the reporting samples of A1 + A2 + A3 + B1 + B2 for 12th grade. The weights used in the data analysis were adjusted based on the information of the target population of the non-SD/LEP and SD/LEP students separately.

[3] In the actual data analysis, the 1996 Mathematics Theme used reporting samples of A2 + A3 + B2. The weights used in the data analysis were adjusted based on the information of the target population of the non-SD/LEP and SD/LEP students separately.

The weighting procedures for 1996 included computing the student's base weight, the reciprocal of the probability that the student was selected for a particular session type. Such weights are those appropriate for deriving estimates from probability samples via the standard Horvitz-Thompson estimator (see Cochran, 1977). These base weights were adjusted for nonresponse and then subjected to a trimming algorithm to reduce a few excessively large weights. The weights were further adjusted by a student-level poststratification procedure to reduce the sampling error. This poststratification was performed by adjusting the weights of the sampled students so that the resulting estimates of the total number of students in a set of specified subgroups of the population corresponded to population totals based on information from the Current Population Survey and U.S. Census Bureau estimates of the population. The subpopulations were defined in terms of race, ethnicity, geographic region, grade, and age relative to grade.

In addition, the weights at grade 8 were poststratified at the school level in an effort to correct an imbalance in the school sample that was observed after the assessments were complete. This procedure has not been used in prior NAEP assessments, and was introduced because at grade 8, the three sample types contained relatively different proportions of schools with large numbers of Black and Hispanic students (termed "high minority" schools). The different school distributions became apparent by reviewing student distributions by sample type and race/ethnicity for the mathematics assessment. In mathematics at grade 8, sample type 2 contained a larger proportion of Black students than sample type 1. Investigation revealed that the differences in student distributions were due to different school distributions by percent minority enrollment. Although the different proportions were within sampling error, a decision was made to adjust the weights at grade 8 for each of the sample types separately so that in each case the resulting estimates of number of schools by percent minority enrollment corresponded to totals based on information from the sampling frame of schools.

The following sections provide an overview of the procedures used to derive the sampling weights. Further details in the derivation of these weights can be found in *The 1996 NAEP Sampling and Weighting Report* (Wallace & Rust, 1999).

10.2.1 Derivation of Reporting Weights for the Main Samples

Separate weights were computed for each assessment in the main samples (mathematics, science, mathematics theme, mathematics estimation, advanced mathematics, and advanced science). In earlier NAEP assessments, excluded students from all subjects were weighted together, separately from assessed students. In 1996, excluded students were weighted with assessed students for each assessment. This change in procedures was adopted because evidence indicated that exclusion rates may not be independent of session type, and because this change simplified the weighting procedures, when accounting for sample type. Reporting weights for the main samples were derived according to the steps outlined below.

10.2.1.1 Student Base Weight

The base weight assigned to a student is the reciprocal of the probability that the student was selected for a particular assessment. That probability is the product of five factors:

1. the probability that the PSU was selected;
2. the conditional probability, given the PSU, that the school was selected;
3. the conditional probability, given the sample of schools in a PSU, that the school was assigned the specified sample type;
4. the conditional probability, given the sample of schools in a PSU, that the school was allocated the specified session type; and
5. the conditional probability, given the school, that the student was selected for the specified session type.

Thus, the base weight for a student may be expressed as the product

$$W_B = PSUWT \bullet SCHWT \bullet SMPTYPWT \bullet SESSWT \bullet STUSCHW$$

where *PSUWT*, *SCHWT*, *SMPTYPWT*, *SESSWT*, and *STUSCHW* are, respectively, the reciprocals of the preceding probabilities.

Variations across the various 1996 assessments in probabilities of selection, and consequently of weights, were introduced by design, either to increase the effectiveness of the sample in achieving its goals of reporting for various subpopulations, or to achieve increased efficiency per unit of cost.

10.2.1.2 Session Nonresponse Adjustment (*SESNRF*)

Sessions were assigned to schools before cooperation status was final. The session nonresponse adjustment was intended to compensate for session type nonresponse due to refusing schools or individual session types not conducted. The first three digits of PSU stratum, called subuniverse (formed by crossing the PSU major stratum and the first socioeconomic characteristic used to define the final PSU stratum; see Section 3.2 for more detail) were used in calculating nonresponse adjustments. The adjustment factors were computed separately within classes formed by subuniverse within sample type for mathematics and science, and by subuniverse for the other assessment types. Occasionally, additional collapsing of classes was necessary to improve the stability of the adjustment factors, especially for the smaller assessment components. Most classes needing collapsing contained small numbers of cooperating schools. Occasionally, classes with low response rates were collapsed.

In subuniverse *s* in session type *h*, the session nonresponse adjustment factor $SESNRF_{hs}$ was given by

$$SESNRF_{hs} = \frac{\sum_{i \in B_{hs}} PSUWT_i \bullet SCHWT_i \bullet SMPTYPWT_i \bullet SESSWT_{hi} \bullet G_i}{\sum_{i \in C_{hs}} PSUWT_i \bullet SCHWT_i \bullet SMPTYPWT_i \bullet SESSWT_{hi} \bullet G_i}$$

where

$PSUWT_i$ = the PSU weight for the PSU containing school *i*;

$SCHWT_i$ = the school weight for school *i*;

$SMPTYPWT_i$ = the sample type weight for school *i*;

$SESSWT_{hi}$ = the session allocation weight for session type *h* in school *i*;

G_i = the estimated number of grade-eligible students in school *i* (the values of G_i were based on QED data);

set B_{hs} = consists of all in-scope originally sampled schools allocated to session type *h* in subuniverse *s* (excluding substitutes); and

set C_{hs} = consists of all schools allocated to session type *h* in subuniverse *s* that ultimately participated (including substitutes).

It should be noted that the nonresponse adjustments assume that nonresponse occurs at random within the categories within which adjustments are made (see Little & Rubin, 1987). Some degree of bias could result to the extent that this assumption is false.

10.2.1.3 School-Level Poststratification Adjustment at Grade 8 (*SCHPSF*)

As discussed earlier, the weights at grade 8 were poststratified so that the resulting estimates of number of public schools by percent minority enrollment corresponded to totals based on information from the sampling frame of schools.

Poststratification adjustments were calculated separately by sample type within assessment type. For the descriptions of the information for stratification, see Section 3.3. Control totals were calculated as the total estimated number of grade-eligible students (based on QED data) in public schools, by percent minority enrollment category. The percent minority enrollment categories used to form adjustment cells were 0-4, 5-14, 15-29, 30-36, 37-44, 45-54, 55-79, 80-94, and 95-100 for mathematics and science sample type 2, and 0-4, 5-14, 15-29, 30-44, 45-79, and 80-100 for all other assessment type/sample type combinations. The smaller sample sizes in the latter group did not support using more categories. The poststratification factor for each class c and session type h is computed by

$$SCHPSF_{hc} = \frac{TOTAL_c}{\sum_{i \in D_{hc}} PSUWT_i \bullet SCHWT_i \bullet SMPTYPWT_i \bullet SESSWT_{hi} \bullet SESNRF_{hs} \bullet G_i}$$

where

$TOTAL_c$ = the total number of grade-eligible students in class c, from the sampling frame;

$PSUWT_i$ = the PSU weight for the PSU containing school i;

$SCHWT_i$ = the school weight for school i;

$SMPTYPWT_i$ = the sample type weight for school i;

$SESSWT_{hi}$ = the session allocation weight for session type h in school i;

$SESNRF_{hs}$ = the session nonresponse adjustment factor for subuniverse s in session type h;

G_i = the estimated number of grade-eligible students in school i (the values of G_i were based on QED data); and

Set D_{hc} = consists of the public schools in class c that participated in session type h.

For some sample types in advanced mathematics and mathematics estimation, two or more poststratification classes were collapsed into one to improve the stability of the adjustment factors. Private schools and new schools (those schools added to the sample through the new school sampling procedure, and so not included on the sampling frame) received school-level poststratification factors of 1.0.

10.2.1.4 Student Nonresponse Adjustment (*STUNRF*)

Student nonresponse adjustment factors were computed separately for each session type. For students in the main samples, the adjustment classes were based on sample type (for mathematics and science), subuniverse, modal age status, and race class (White or Asian/Pacific Islander, other). In some cases, two or more nonresponse classes were collapsed into one to improve the stability of the adjustment factors. For each class c in session type h, the student nonresponse adjustment factor $STUNRF_{hc}$ is computed by

$$STUNRF_{hc} = \frac{\sum_{j \in A_{hc}} PSUWT_j \bullet SCHWT_j \bullet SCHPSFj \bullet SMPTYPWT_j \bullet SESSWT_{hj} \bullet SESNRF_{hj} \bullet STUSCHW_{hj}}{\sum_{j \in B_{hc}} PSUWT_j \bullet SCHWT_j \bullet SCHPSFj \bullet SMPTYPWT_j \bullet SESSWT_{hj} \bullet SESNRF_{hj} \bullet STUSCHW_{hj}}$$

where

$PSUWT_j$ = the PSU weight for the PSU containing student j;

$SCHWT_j$ = the school weight for the school containing student j;

$SCHPSF_j$ = for grade 8, the school poststratification factor for the school containing student j (set to 1.0 for grades 4 and 12);

$SMPTYPWT_j$ = the sample type weight for the school containing student j;

$SESSWT_{hj}$ = the session allocation weight for the school containing student j in session type h;

$SESNRF_{hj}$ = the session nonresponse adjustment factor for the school containing student j in session type h;

$STUSCHW_{hj}$ = the within-school student weight for student j in session type h;

Set A_{hc} = consists of the students in class c who were sampled for session type h and not excluded; and

Set B_{hc} = consists of the students in class c who were assessed in session type h.

Excluded students received nonresponse adjustments of 1.0.

10.2.1.5 Trimming of Weights

In a number of cases, students were assigned relatively large weights. One cause of large weights was underestimation of the number of eligible students in some schools leading to inappropriately low probabilities of selection for those schools. A second major cause is the presence of large schools (high schools in particular) in PSUs with small selection probabilities. In such cases, the maximum permissible within-school sampling rate (determined by the maximum sample size allowed per school—see Chapter 3) could well be smaller than the desired overall within-PSU sampling rate for students. Large weights arose also because very small schools were, by design, sampled with low probabilities. Other large weights arose as the result of high levels of nonresponse coupled with low to moderate probabilities of selection, and the compounding of nonresponse adjustments at various levels.

Students with notably large weights have an unusually large impact on estimates such as weighted means. Since, under some simplifying assumptions, the variability in weights contributes to the variance of an overall estimate by an approximate factor $1 + V^2$, where V^2 is the relative variance of the weights, an occasional unusually large weight is likely to produce large sampling variances of the statistics of interest, especially when the large weights are associated with students with atypical performance characteristics.

To reduce this problem, a procedure of trimming a few of the more extreme weights to values somewhat closer to the mean weight was applied. This trimming can increase the accuracy of the resulting survey estimates, substantially reducing V^2 and hence the sampling variance, while introducing a small bias. The trimming algorithm was identical to that used since 1984, and had the effect of trimming the weights of students from any school that contributed more than a specified proportion, ζ, to the estimated variance of the estimated number of students eligible for assessment. The trimming was done separately within sample type for mathematics and science, and overall for mathematics estimation and mathematics theme. Trimming was not done for the advanced mathematics or advanced science assessments because advanced students were expected to be concentrated in certain schools, so that the trimming algorithm was not appropriate in these cases. In each case, the value of the proportion ζ was chosen to be $10/K$, where K was the number of schools in which a specified assessment was conducted. The number of schools where weights were trimmed was no more than seven in any one assessment. The most extreme trimming factors applied were of the order of 0.65; trimming affects the weights of only a very small proportion of the assessed and excluded students.

Table 10-2 shows the distributions of eligible students based on the trimmed weights of assessed students for the science samples in sample type 2 (the reporting population) for each grade. The distributions are similar to those before trimming shown in Tables 10-6, 10-7, and 10-8. To the extent that the characteristics in the table are related to student performance on the science assessment, there is a small bias introduced in the assessment by trimming.

Table 10-2

Distribution of Populations of Eligible Students Based on Trimmed Weights of Assessed Students in Participating Schools, 1996 Main NAEP Science Sample, Sample Type 2

Population	Grade 4	Grade 8	Grade 12
Total population	3,389,669	3,365,499	2,491,555
Age category			
At modal age or younger	64.6%	57.9%	64.5%
Older than modal age	35.4%	42.1%	35.5%
Race/ethnicity category			
White	61.0%	64.2%	69.1%
Black	14.3%	15.7%	12.3%
Hispanic	16.9%	13.6%	11.1%
Other	7.8%	6.6%	7.5%
Gender[1]			
Male	49.6%	50.2%	48.3%
Female	50.2%	49.6%	51.7%
SD			
Yes	5.2%	5.7%	3.1%
No	94.8%	94.3%	96.9%
LEP			
Yes	3.0%	1.9%	2.2%
No	97.0%	98.1%	97.8%
SD, LEP			
SD yes, LEP yes	0.1%	0.1%	0.0%
SD yes, LEP no	5.1%	5.6%	3.0%
SD no, LEP yes	3.0%	1.8%	2.1%
SD no, LEP no	91.8%	92.5%	94.8%

[1] For a very small percentage of students at grades 4 and 8, gender is unknown.

10.2.1.6 Reporting Factor

Each set of trimmed weights for a given sample type sums to the target population. Reporting factors were assigned to students in order to scale back the trimmed weights so that final student (reporting) weights within each reporting population (which may combine students from different sample types) sum to the target population. The reporting factors assigned to students are specific to the reporting populations defined in Table 10-1. Each assessed and excluded student in the reporting population received a reporting factor as shown in Table 10-3 on the following page.

Table 10-3
Reporting Factors for Assessed and Excluded Students

	Non-SD/LEP Students Sample Type			SD/LEP Students Sample Type		
	1	2	3	1	2	3
Grade 4						
Mathematics	0.5	0.5	—	1	—	—
Science	—	1	—	—	1	—
Mathematics theme	—	1	—	—	1	—
Mathematics estimation	1	—	—	1	—	—
Grade 8						
Mathematics	0.5	0.5	—	1	—	—
Science	—	1	—	—	1	—
Mathematics theme	—	1	—	—	1	—
Mathematics estimation	1	—	—	1	—	—
Advanced mathematics (B)	—	0.35	0.65	—	1	—
Grade 12						
Mathematics	0.5	0.5	—	1	—	—
Science	—	1	—	—	1	—
Mathematics theme	—	1	—	—	1	—
Mathematics estimation	0.6667	0.3333	—	1	—	—
Advanced mathematics (B)	—	—	1	—	—	1
Advanced science (C)	—	1	—	—	1	—

10.2.1.7 Student-Level Poststratification

As in most sample surveys, the respondent weights are random variables that are subject to sampling variability. Even if there were no nonresponse, the respondent weights would at best provide unbiased estimates of the various subgroup proportions. However, since unbiasedness refers to average performance over a conceptually infinite number of replications of the sampling, it is unlikely that any given estimate, based on the achieved sample, will exactly equal the population value. Furthermore, the respondent weights have been adjusted for nonresponse and a few extreme weights have been reduced in size.

To reduce the mean squared error of estimates using the sampling weights, these weights were further adjusted so that estimated population totals for a number of specified subgroups of the population, based on the sum of weights of students of the specified type, were the same as presumably better estimates based on composites of estimates from the 1993 and 1994 Current Population Survey and 1996 population projections made by the U.S. Census Bureau. This adjustment, called poststratification, is intended especially to reduce the mean squared error of estimates relating to student populations that span several subgroups of the population, and thus also to reduce the variance of measures of changes over time for such student populations.

The poststratification in 1996 was done for the mathematics, science, mathematics estimation, and mathematics theme assessments in each grade. The advanced mathematics and advanced science assessments were not poststratified. Within each grade and assessment type group, poststratification adjustment cells were defined in terms of race, ethnicity, and Census region as shown in Table 10-4. Note that NAEP region was used in previous years instead of Census region. This change was made because the data from the Current Population Survey and Census Projections are more reliable for Census regions than for NAEP regions.

Table 10-4

Major Subgroups for Poststratification in 1996

Subgroup	Race	Ethnicity	Census Region[1]
1	White	Not Hispanic	Northeast
2	White	Not Hispanic	Midwest
3	White	Not Hispanic	South
4	White	Not Hispanic	West
5	Any	Hispanic	Any
6	Black	Not Hispanic	Any
7	Other	Not Hispanic	Any

[1] Census region is the same as the NAEP region in Table 3-2 used for stratification and reporting, except that DE, DC, and MD moved from the Northeast to the South, OK and TX moved from the West to the South, Central is called Midwest, and Southeast is called South.

These subgroups were used as adjustment cells at grade 12. Each of these cells accounts for between 5 percent (Subgroup 7) and 21 percent (Subgroup 3) of the population. For grades 4 and 8, each of the seven subgroups was further divided into two eligibility classes: of modal age and not of modal age.

The procedure used at grade 12 was adopted because the independent estimates of the numbers of students in the population did not provide consistent data on the numbers of twelfth grade students by age. Specifically, the counts of twelfth grade students age 17 and older are not reliable because they include adult education students. This procedure has been used since 1988. (See Rust, Bethel, Burke, & Hansen, 1990, and Rust, Burke, & Fahimi, 1992, for further details.)

Thus, there were 7 or 14 cells for poststratification. The poststratified weight for each student within a particular cell was the student's base weight, with adjustments for nonresponse and trimming, and the reporting factor from Section 10.2.1.6, times a poststratification factor. The poststratification factor for student *j* in session type *h* and poststratification adjustment class *c* is given by

$$PSFCTR_{hc} = \frac{TOTAL_c}{\sum_{j \in C_{hc}} W_{Bj} \bullet SESNRF_j \bullet SCHPSF_j \bullet STUNRF_j \bullet TRIMFCTR_j \bullet RPTFCTR_j}$$

where

W_{Bj} = the base weight for student *j* (see Section 10.2.1.1);

$TOTAL_c$ = the total number of grade-eligible students in class *c*, from the October 1993 and 1994 Current Population Surveys and 1996 population projections;

$SESNRF_j$ = the session nonresponse adjustment factor for the school containing student *j* in session type *h*;

$SCHPSF_j$ = for grade 8, the school poststratification factor for the school containing student j (set to one for grades 4 and 12);

$STUNRF_j$ = the student nonresponse adjustment for student j;

$TRIMFCTR_j$ = the trimming factor for student j;

$RPTFCTR_j$ = the reporting factor for student j;

Set C_{hc} = consists of the students in class c who were assessed in session type h, except those at grade 12 who were age 17 or older.

Note that students at grade 12 who were age 17 or older received the poststratification factor according to their adjustment class and session type even though they were not used in calculating the factor. Details of the procedures used to obtain totals in the numerator of the adjustment factor are provided in Wallace and Rust (1999).

10.2.1.8 The Final Student Reporting Weights

The final weight assigned to a student is the student full-sample reporting weight. This weight is the student's base weight after the application of the various adjustments described above. The student full-sample reporting weight was used to derive all estimates of population and subpopulation characteristics that have been presented in the various NAEP reports, including simple estimates such as the proportion of students of a specified type who would respond in a certain way to an item and more complex estimates such as mean proficiency levels. The distributions of the final student reporting weights are given in Table 10-5.

As indicated earlier, under some simplifying assumptions the factor $1 + V^2$ indicates the approximate relative increase in variance of estimates resulting from the variability in the weights. The factor V^2 for each sample is readily derivable from Table 10-5 by squaring the ratio of the standard deviation to the mean weight. These factors, resulting from the combined effect of the variations in weights introduced by design and from other causes, are discussed in Section 10.2.3.

10.2.2 Evaluation of Potential for Bias Resulting from School and Student Nonparticipation

Although school and student nonresponse adjustments are intended to reduce the potential for nonparticipation to bias the assessment results, they cannot completely eliminate this potential bias with certainty. The extent of bias remains unknown, of course, since there are no assessment data for the nonparticipating schools and students.

Some insight can be gained about the potential for residual nonresponse bias, however, by examining the weighted school- and student-level distributions of characteristics known for both participants and nonparticipants, especially for those characteristics known or thought likely to be related to achievement on the assessment. If the distributions for the full sample of schools (or students) without the use of nonresponse adjustments are close to those for the participants with nonresponse adjustments applied, there is reason to be confident that the bias from nonparticipation is small.

Table 10-5

Distribution of Final Student Reporting Weights, 1996 Main Samples

Sample	Number of Cases	Mean	Standard Deviation	Minimum	25th Percentile	Median	75th Percentile	Maximum
Grade 4								
Mathematics	6831	577.41	380.69	92.57	315.28	486.57	729.48	3887.53
Science	8061	489.35	324.35	65.04	275.04	399.02	598.53	4872.34
Mathematics Theme	2072	1903.80	1163.23	576.00	1133.85	1587.94	2276.41	10676.50
Mathematics Estimation	1130	3409.86	2052.49	685.71	1935.01	3010.68	4316.83	12843.05
Grade 8								
Mathematics	7312	510.55	389.16	62.92	247.63	389.41	652.26	5027.91
Science	8200	455.26	388.04	75.47	219.81	313.58	562.02	3605.79
Mathematics Theme	2177	1714.81	1124.20	388.72	921.25	1258.58	2321.66	8720.24
Mathematics Estimation	1255	2974.61	1906.19	338.54	1398.58	2574.86	3952.75	9812.97
Advanced Mathematics	2339	346.90	246.57	100.98	184.65	234.99	407.26	1545.58
Grade 12								
Mathematics	7020	415.75	257.34	64.39	226.94	337.48	539.29	2313.01
Science	7963	380.19	222.13	64.80	226.82	302.07	500.33	1759.55
Mathematics Theme	2097	1442.96	862.82	313.34	879.14	1117.08	1789.78	5171.06
Mathematics Estimation	1472	1949.24	1050.36	488.10	1170.72	1743.95	2523.71	8484.11
Advanced Mathematics	2972	235.55	127.79	77.16	142.67	182.49	324.65	911.09
Advanced Science	2436	241.49	137.63	58.23	134.85	190.13	323.81	978.81

There are several school-level characteristics available for both participating and nonparticipating schools. The tables below show the combined impact of nonresponse and of the nonresponse adjustments on the distributions of schools (weighted by the estimated number of eligible students enrolled) and students, by the type of school (public, Catholic, other nonpublic) the size of the school as measured by the estimated number of eligible students enrolled, and the urban/rural nature of the place where the school is located. Three size classes have been defined for each grade. The data are for the science assessment, sample type 2 (the reporting population). Science from sample type 2 was chosen because it is the largest assessment at each grade. It is assumed that other large assessments would behave similarly.

Several student-level characteristics are available for both absent and assessed students. The tables that follow show the impact of school nonresponse and nonresponse adjustments, and student nonresponse and nonresponse adjustments on the distributions of eligible students for each grade. This discussion also focuses on the science assessment for sample type 2, since it is the largest. The distributions are presented by age category (at or below modal age, and above modal age), race category (White, Black, Hispanic, and other), gender, SD, and LEP.

Table 10-6 shows the weighted marginal distributions of students for each of the three classification variables for each grade, using weighted eligible schools. The distributions before school nonresponse adjustments are based on the full sample of in-scope schools for science--those participating, plus those refusals for which no substitute participated. The distributions after school nonresponse adjustments are based only on participating schools for science, with school nonresponse adjustments applied to them.

It can be seen from the tables that, even though the level of school nonparticipation is as high as 22.6 percent for grade 12 (see Table 3-11) and somewhat lower for the other grades, for the most part, the distributions for the three characteristics considered remain similar. Exceptions may be medium and large schools, and midsize cities and urban fringe of large cities at grade 12; and urban fringe of large cities and rural nonMSAs at grade 4.

Table 10-6

Distribution of Populations of Eligible Students Based on Full Weighted Sample of Eligible Schools, Before and After School Nonresponse Adjustments, 1996 Main NAEP Science Samples, Sample Type 2

	Grade 4		Grade 8		Grade 12	
Population	**Before**	**After**	**Before**	**After**	**Before**	**After**
Total population	3,777,554	3,777,554	3,198,390	3,198,390	2,762,448	2,762,448
School type						
Catholic	5.7%	7.2%	6.0%	6.8%	5.5%	5.9%
Other Nonpublic	5.6%	4.3%	4.7%	4.6%	4.2%	3.4%
Public	88.7%	88.5%	89.3%	88.7%	90.3%	90.7%
School size[1]						
1	18.8%	19.8%	10.8%	11.6%	5.0%	4.7%
2	46.4%	47.2%	55.7%	55.8%	70.5%	67.0%
3	34.8%	33.0%	33.5%	32.6%	24.5%	28.3%
School location						
Large city	18.3%	19.9%	17.7%	17.9%	15.4%	16.8%
Midsize city	19.4%	19.7%	18.1%	18.1%	16.3%	18.3%
Urban fringe/large city	23.9%	24.0%	23.1%	21.8%	23.3%	21.2%
Urban fringe/midsize city	13.7%	11.9%	15.8%	16.7%	15.3%	14.4%
Large town	0.3%	0.5%	0.7%	0.7%	1.5%	0.9%
Small town	10.5%	8.8%	9.9%	8.8%	14.4%	15.5%
Rural MSA	2.3%	1.8%	5.1%	6.1%	3.7%	3.7%
Rural nonMSA	11.5%	13.5%	9.6%	9.9%	10.2%	9.5%

[1] Distributions by school size are not comparable to previous assessments, since students were eligible by grade only (instead of by grade or age) in 1996. School size = number of eligible students enrolled:

	1	2	3
Grade 4	1-49	50-99	100 +
Grade 8	1-49	50-299	300 +
Grade 12	1-49	50-399	400 +

Table 10-7 shows the distributions of the same three classification variables, plus additional distributions of student-level characteristics, using weighted eligible students. The distributions before student nonresponse adjustments are based on assessed and absent science students (with base weights adjusted for school nonparticipation). The distributions after student nonresponse adjustments are based on assessed science students only, with the student nonresponse adjustments also applied to them.

Table 10-7

Distribution of Populations of Eligible Students Before and After Student Nonresponse Adjustments
1996 Main NAEP Science Samples, Sample Type 2

Population	Grade 4 Before	Grade 4 After	Grade 8 Before	Grade 8 After	Grade 12 Before	Grade 12 After
Total population	3,419,493	3,419,493	3,428,867	3,428,867	2,496,241	2,496,241
School type						
Catholic	7.7%	7.8%	6.1%	6.3%	6.4%	8.1%
Other Nonpublic	4.5%	4.6%	4.3%	4.4%	3.6%	4.2%
Public	87.8%	87.6%	89.6%	89.3%	90.0%	87.6%
School location						
Large city	18.9%	18.9%	13.2%	13.2%	17.0%	16.9%
Midsize city	19.2%	19.3%	15.9%	15.9%	18.2%	16.9%
Urban fringe/large city	25.2%	25.2%	20.8%	20.8%	21.4%	21.7%
Urban fringe/midsize city	12.1%	12.0%	19.3%	19.4%	13.6%	14.8%
Large town	0.5%	0.5%	0.5%	0.5%	1.0%	1.0%
Small town	8.9%	9.0%	11.6%	11.5%	15.5%	15.2%
Rural MSA	1.8%	1.8%	7.1%	7.1%	3.9%	4.1%
Rural nonMSA	13.3%	13.3%	11.6%	11.7%	9.4%	9.6%
Age category						
At modal age or younger	64.6%	64.5%	57.5%	57.6%	64.3%	64.5%
Older than modal age	35.4%	35.5%	42.5%	42.4%	35.7%	35.5%
Race/ethnicity category						
White	61.4%	61.2%	64.9%	64.7%	69.4%	69.1%
Black	14.4%	14.2%	15.7%	15.4%	12.6%	12.2%
Hispanic	16.6%	16.8%	13.0%	13.3%	11.0%	11.1%
Other	7.6%	7.8%	6.4%	6.5%	7.1%	7.5%
Gender[1]						
Male	49.6%	49.6%	50.3%	49.6%	48.7%	48.4%
Female	50.2%	50.2%	49.4%	50.1%	51.2%	51.6%
SD						
Yes	5.3%	5.3%	6.1%	5.8%	3.4%	3.0%
No	94.7%	94.7%	93.9%	94.2%	96.6%	97.0%
LEP						
Yes	3.0%	3.0%	1.9%	1.9%	2.1%	2.2%
No	97.0%	97.0%	98.1%	98.1%	97.9%	97.8%
SD, LEP						
SD yes, LEP yes	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
SD yes, LEP no	5.2%	5.2%	6.0%	5.7%	3.3%	3.0%
SD no, LEP yes	2.9%	2.9%	1.8%	1.8%	2.1%	2.1%
SD no, LEP no	91.8%	91.8%	92.1%	92.5%	94.6%	94.8%

[1] Gender is unknown for a small percentage of students.

The rates of student nonparticipation were 5.1 percent for grade 4, 6.9 percent for grade 8, and 22.5 percent for grade 12 (see Table 3-11). The table shows that with one exception at grade 12, for the distributions of type of school attended and place where the school is located, the combined effect of student nonparticipation and the subsequent nonresponse adjustments have resulted in very little change in distribution. The changes in the distribution of school type at grade 12 reflect the relatively high nonresponse rate of grade 12 public school students (22.7 percent versus 8.5 percent for nonpublic school students; see Table 3-9).

Table 10-8 shows the weighted distributions of eligible students in participating schools, using the base weights of assessed and absent students unadjusted for school-level nonresponse. Tables 10-7 and 10-8 show that both school and student-level nonresponse and nonresponse adjustments have little effect on the distributions of eligible students by age, race/ethnicity, gender, SD and LEP. All of the distributions in the tables are similar.

Table 10-8

Distribution of Populations of Eligible Students Before School and Student Nonresponse Adjustments
1996 Main NAEP Science Samples, Sample Type 2

Population	Grade 4	Grade 8	Grade 12
Total population	2,635,218	2,743,713	1,935,174
Age category			
At modal age or younger	64.3%	56.3%	63.9%
Older than modal age	35.7%	43.7%	36.1%
Race/ethnicity category			
White	60.8%	66.6%	70.3%
Black	14.6%	14.0%	12.4%
Hispanic	16.9%	13.0%	10.3%
Other	7.7%	6.5%	6.9%
Gender[1]			
Male	49.7%	50.3%	48.8%
Female	50.1%	49.5%	51.2%
SD			
Yes	5.3%	6.2%	3.4%
No	94.7%	93.8%	96.6%
LEP			
Yes	3.2%	2.0%	2.0%
No	96.8%	98.8%	98.0%
SD, LEP			
SD yes, LEP yes	0.1%	0.1%	0.1%
SD yes, LEP no	5.2%	6.1%	3.3%
SD no, LEP yes	3.1%	1.9%	1.9%
SD no, LEP no	91.7%	91.9%	94.7%

[1] Gender is unknown for a small percentage of students.

When comparing the distributions in Table 10-7 before and after student nonresponse adjustments, we expect the distributions by age category and race/ethnicity to be similar because these variables were used to determine student nonresponse adjustment classes. However, the distributions by gender, SD, and LEP are also similar. To the extent that nonrespondents would perform like respondents with the same characteristics (defined by the classification variables in the tables), the bias in the assessment data is small.

Further information about potential nonresponse bias can be gained by studying the absent students. NAEP proficiency estimates are biased to the extent that assessed and absent students within the same weighting class differ in their distribution of proficiency. It seems likely that the assumption that absent students are similar in proficiency to assessed students is reasonable for some absent students—namely, those whose absence can be characterized as random. Conversely, it seems likely that students with longer and more consistent patterns of absenteeism—such as truants, dropouts, near dropouts, and the chronically ill—are unlikely to be as proficient as their assessed counterparts.

In the 1996 assessments, schools were asked to classify each absent student into one of nine categories. The results of this classification for the science assessment are shown in Table 10-9. The discussion focuses on the science assessment because it is the largest. It is assumed that the other large assessments would behave similarly.

Table 10-9 shows that, as anticipated, the majority of absence from the assessment was the result of an absence from school of a temporary and unscheduled nature. The table shows that absence among twelfth graders occurs at about four times the rate of absence among fourth or eighth graders. The proportion of absence classified as temporary differs somewhat by grade, but is of the same magnitude for grades 8 and 12. These two facts taken together suggest strongly that a substantial proportion of the temporary absences among twelfth grade students is not a result of illness, because such absences are occurring at almost three times the rate that they do among fourth or eighth grade students. Whereas it might be reasonable to regard temporary absence due to illness as independent of proficiency, for other temporary absences, this appears less tenable. The data in the table give support to the contention that, at grade 4, student absences are unlikely to introduce any significant bias into NAEP estimates. The absentee rate is low; most absences are temporary, and three quarters of the remaining absences are a result of parental refusal.

Table 10-9

Weighted Distribution of Absent Students by Nature of Absenteeism for All Grades
1996 Science Assessment, Sample Type 2

Nature of Absenteeism	Grade 4	Grade 8	Grade 12
Temporary absence[1]	78.2%	68.0%	63.6%
Long-term absence[2]	1.6%	1.4%	0.8%
Chronic truant	0.2%	2.7%	1.4%
Suspended or expelled	0.7%	6.4%	0.4%
Parent refusal	16.4%	13.1%	9.2%
Student refusal	0.0%	3.2%	12.0%
In school, did not attend session	0.0%	3.0%	7.0%
In school, not invited[3]	0.0%	0.8%	0.0%
Other	0.3%	0.9%	3.9%
Missing	2.6%	0.4%	1.8%
Total absentee sample	384	569	2,269
Total sample size	7,689	8,343	9,807
Overall absentee rate	5.0%	6.8%	23.1%

[1] Absent less than two weeks due to illness, disability, or excused absence.
[2] Absent more than two weeks due to illness or disability.
[3] In school, but not invited to assessment session due to disruptive behavior.

At grades 8 and 12, however, a significant component of absenteeism is not temporary or due to parental refusal. Chronic truants, those suspended, and those in school but not invited, constitute the obvious candidates for potential bias. These groups comprise 12.1 percent of absent students at grade 8 (or

0.8 percent of the total sample) and 8.8 percent of absent students at grade 12 (or 2.0 percent of the total sample). Thus their potential for introducing significant bias under the current procedures is minor.

10.2.3 Derivation of Modular Weights for the Main Samples

As discussed earlier, modular weights were computed to facilitate analyses involving students from a single sample type. The same procedures were used to derive modular and reporting weights up through the weight trimming step described in Section 10.2.1.5. After trimming, weighting continued in two parallel processes. Final student reporting weights were the result of one of these processes, and modular weights were the result of the other.

Modular weights differ from reporting weights in two ways. First, they do not contain the reporting factor described in Section 10.2.1.6. The second difference lies in the manner in which the weights were poststratified. The modular weights were poststratified as described in Section 10.2.1.7, except that each sample type within each grade and session was poststratified separately. The same initial adjustment cells were used: 7 cells based on race/region for each session/sample type combination at grade 12, and 14 cells based on race/region and eligibility class (of modal age, not of modal age) for each session/ sample type combination at grades 4 and 8. Some adjustment factors are quite variable for the same adjustment cell across different sample types for the same grade and session. This indicates that the individual samples by sample type may not be particularly stable, especially for the smaller sessions of mathematics theme and mathematics estimation.

The modular weight is the student's base weight after the application of the various adjustments described in Section 10.2.1, except for the reporting factor, and with the new poststratification factor described above. The distributions of the modular weights are given in Table 10-10. Note that modular weights are identical to reporting weights for a particular grade/session/sample type combination when that sample type is the only one included in the reporting population for that grade and session.

10.2.4 Derivation of Student Weights for the Long-Term Trend Samples

Final student weights were derived for the long-term trend samples in a manner similar to that used in 1994. The procedure was identical to that used to derive reporting weights, described in Section 10.2.1, except as noted below.

As in 1994, excluded students for all subjects in the long-term trend samples were weighted together, separately from assessed students.

Base weight. A student's base weight is the reciprocal of the product of four factors—all of the factors used for reporting weights except sample type weight (*SMPTYPWT*).

Session nonresponse adjustments. Session nonresponse adjustments were calculated separately at each age class for the spiral assessment, the tape assessment, and excluded students, within classes formed by subuniverse. The formula for the adjustment does not contain sample type weight (*SMPTYPWT*), and for excluded students, it does not contain session allocation weight (*SESSWT*). G_i is the estimated number of age- plus grade-eligible students in the school for the spiral assessment and excluded students, and the estimated number of age-eligible students for the tape assessment. For excluded students, Sets B and C are not specific to any particular session.

Table 10-10

Distribution of Modular Weights, Main Samples

Grade/Session/ Sample Type	Number of Cases	Mean	Standard Deviation	Minimum	25th Percentile	Median	75th Percentile	Maximum
Grade 4								
Mathematics/1	3808	1035.39	615.46	163.33	579.23	903.43	1366.37	3812.67
Mathematics/2	3691	1068.73	626.06	207.26	637.04	930.71	1305.99	4446.43
Mathematics/3	4077	967.54	670.28	211.91	513.62	759.53	1208.03	6569.06
Science/2	8061	489.35	324.35	65.04	275.04	399.02	598.53	4872.34
Science/3	4600	857.54	591.01	108.77	463.61	646.17	1032.26	4642.09
Mathematics Theme/2	2072	1903.80	1163.23	576.00	1133.85	1587.94	2276.80	10676.50
Mathematics Theme/3	2239	1761.80	1061.66	178.33	1063.45	1373.85	2247.80	9972.62
Mathematics Estimation/1	1130	3490.86	2052.49	685.71	1935.45	3010.68	4316.83	12843.05
Mathematics Estimation/3	1109	3556.97	2235.80	1006.89	2080.57	2916.57	4161.25	13829.45
Grade 8								
Mathematics/1	4107	908.97	620.95	106.84	405.18	770.50	1241.29	4313.67
Mathematics/2	4004	932.35	802.10	146.84	465.54	637.59	1098.33	6675.87
Mathematics/3	4128	904.35	571.76	165.42	505.73	704.53	1175.81	5003.16
Science/2	8200	455.26	388.04	75.47	219.81	313.58	562.02	3605.79
Science/3	4520	825.92	634.43	113.78	386.38	611.60	1026.86	4287.45
Mathematics Theme/2	2177	1714.81	1124.20	388.72	921.25	1258.58	2321.66	8720.24
Mathematics Theme/3	2264	1648.91	1050.29	459.90	889.19	1384.34	2006.79	6131.34
Mathematics Estimation/1	1255	2974.61	1906.19	338.54	1398.58	2574.86	3952.75	9812.97
Mathematics Estimation/3	1097	3403.04	1856.24	663.36	1873.01	3079.88	4303.41	13067.90
Advanced Mathematics/2	805	890.46	661.32	288.53	511.84	645.93	891.71	3849.92
Advanced Mathematics/3	1562	557.79	386.61	185.10	286.90	385.01	684.21	2377.82
Grade 12								
Mathematics/1	3732	789.88	495.08	119.49	415.49	600.65	1100.18	3508.86
Mathematics/2	3913	750.91	451.42	103.41	434.29	614.34	1036.98	4104.76
Mathematics/3	3672	828.88	521.21	65.20	467.94	683.04	1071.83	2884.61
Science/2	7963	380.19	222.13	64.80	226.82	302.07	500.33	1759.55
Science/3	4179	718.80	465.56	66.96	406.63	587.94	884.80	3559.46
Mathematics Theme/2	2097	1442.96	862.82	313.34	879.14	1117.08	1789.78	5171.06
Mathematics Theme/3	1944	1524.34	789.35	434.13	922.15	1248.22	1991.56	6331.79
Mathematics Estimation/1	1090	2616.75	1353.39	667.28	1641.53	2331.77	3387.79	7581.54
Mathematics Estimation/2	431	6810.82	3947.11	2181.87	4076.82	5516.38	8886.82	19094.18
Mathematics Estimation/3	458	6384.23	4477.96	2416.15	3611.22	4792.51	6366.71	23079.02
Advanced Mathematics/3	2972	235.55	127.79	77.16	142.67	182.49	324.65	911.09
Advanced Science/2	2436	241.49	137.63	58.23	134.85	190.13	323.81	978.81

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School-level poststratification. There was no school-level poststratification for the long-term trend assessments.

Student nonresponse adjustments. Student nonresponse adjustments were calculated separately at each age class for the spiral assessment and the tape assessment within classes formed by subuniverse and modal grade status (at or above modal grade, below modal grade). For excluded students at each age class, the adjustments were calculated within classes formed by subuniverse. The formula for the adjustment does not contain sample type weight (*SMPTYPWT*) or the school-level poststratification factor (*SCHPSF*), and for excluded students, it does not contain session allocation weight (*SESSWT*). For excluded students, Set A consists of all excluded students in class C, and Set B consists of the excluded students in class C for whom an excluded student questionnaire was completed.

Trimming. Trimming was done separately for the spiral assessment, the tape assessment, and excluded students at each age class.

***Reporting factor*:** There was no reporting factor for the long-term trend assessments.

Student-level poststratification. Poststratification adjustments were calculated separately at each age class for the spiral assessment, the tape assessment, and excluded students. Adjustment cells were formed by race/region (as described in Section 10.2.1.7) and eligibility class (eligible by grade and of modal age, eligible by age only, and eligible by grade but not of modal age). Thus 21 cells were used for the spiral assessment and excluded students at each age class. Seven cells (by race/region only) were used for the tape assessment at each age class. For each cell the poststratification factor is a ratio whose denominator is the sum of weights (after adjustments for nonresponse and trimming) of assessed and excluded students, and whose numerator is an adjusted estimate of the total number of students in the population who are members of the cell.

Final student weights. The final weight assigned to each student is the student's base weight after application of the various adjustments described above. The distributions of the final student weights for the long-term trend samples are given in Table 10-11.

10.2.5 Other Weights

Special weighting adjustments were developed for certain subsets of the fourth-grade and eighth-grade students assessed in the main samples. The weights for these subsets, with these adjustments applied, were used in equating the results of the national and state assessments for subjects they had in common. Also, weights appropriate for analyzing school-level data files were developed.

10.2.5.1 Weights for Equating National and State-by-State Samples

Weights for Equating National and State-by-State Assessments. The fourth-grade mathematics and eighth-grade mathematics and science assessments conducted in February 1996 in the NAEP 1996 State Assessment consisted of identical assessment material to that administered in the corresponding national main sample sessions. Technical details of the NAEP 1996 State Assessments are given in Allen, Jenkins, Kulick, and Zelenak (1997) and Allen, Swinton, Isham, and Zelenak (1998). The national and state-by-state assessments were equated so that state and national results could be reported on a common scale. The equating was achieved by using from each assessment that part of the sample representing a common population. For the national samples, this consisted of those fourth-grade or eighth-grade public-school

Table 10-11

Distribution of Final Student Weights, Long-Term Trend Samples

Sample	Number of Cases	Mean	Standard Deviation	Minimum	25th Percentile	Median	75th Percentile	Maximum
Age Class 9								
Reading/Writing	5019	923.09	442.60	227.42	599.94	827.79	1140.65	4314.81
Mathematics/Science	5414	613.85	288.34	189.55	420.00	562.09	696.40	2736.30
Excluded Students	1117	431.66	359.05	121.12	231.89	327.31	448.31	3049.25
Age Class 13								
Reading/Writing	5493	855.31	369.72	54.00	840.26	840.26	1073.19	3655.57
Mathematics/Science	5658	594.48	284.74	461.32	516.88	516.88	670.97	3038.10
Excluded Students	933	465.54	347.50	38.77	342.48	342.48	482.85	2909.37
Age Class 17								
Reading/Writing	4669	944.55	546.50	203.58	796.32	796.32	1207.55	3814.59
Mathematics/Science	3539	900.51	453.46	287.24	782.92	782.92	1022.00	3505.95
Excluded Students	713	549.66	338.57	160.95	471.56	471.56	621.88	2364.01

students from a participating state (including the District of Columbia) who were assessed in the main sample mathematics or (for grade 8) science assessment reporting samples.

Although each sample of students received appropriate weights from the weighting procedure used for the national assessment, in an effort to increase the precision of the equating process, an additional weighting adjustment was developed and applied to each subsample by grade and subject, solely for use in equating. For each subsample, the distributions of the main sample reporting weights for three categorical variables were adjusted to agree closely with those obtained from the weighted aggregate sample from the state assessments from the participating states. The first two variables were NAEP region (Northeast, Southeast, Central, and West) and race/ethnicity (White nonHispanic, Black nonHispanic, Hispanic, and other). For fourth-grade mathematics, the third variable was mathematics skill (good, not sure, other). For eighth-grade mathematics, the third variable was the student's mathematics course (eighth-grade mathematics, pre-algebra, algebra, other). For eighth-grade science, the third variable was the student's science course (earth science only, physical science only or only earth science and physical science, other). The categorical variables and control totals for each of the assessed grades and subjects are presented in Tables 10-12 and 10-13.

Table 10-12

First and Second Categorical Variables Used for Raking[1]

Raking Dimensions	Fourth Grade Mathematics Control Total	Eighth Grade Mathematics Control Total	Eighth Grade Science Control Total
First Dimension			
NAEP Region			
1. Northeast	631,451	480,785	475,079
2. Southeast	733,191	723,032	726,322
3. Central	427,577	433,541	432,580
4. West	932,339	904,369	915,815
Total	2,724,558	2,541,727	2,549,797
Second Dimension			
Race/Ethnicity			
1. White nonHispanic	1,690,310	1,596,274	1,590,164
2. Black nonHispanic	408,725	377,660	372,715
3. Hispanic	454,883	408,197	419,467
4. Other	170,641	159,595	167,451
Total	2,724,558	2,541,727	2,549,797

[1] Numbers may not add up exactly due to rounding.

The equating of each weight distribution was achieved using a procedure known as iterative proportional fitting (described by Little & Rubin, 1987). At the end of the fitting, adjustment factors were derived and multiplied to the main sample weights for each subgroup to force their distribution to agree with that from the aggregated state samples, for each of these three variables in turn. This process was then repeated, and the final set of adjusted weights was compared with the state sample weights on all three distributions, and found to be in very close agreement. Table 10-14 shows the distribution of the adjustment factors for each of the grades and subjects assessed.

Table 10-13

Third Categorical Variable Used for Raking[1]

	Control Totals
Grade 4	
Mathematics Skill	
1. Good	1,734,093
2. Not sure	634,732
3. Other	355,733
Total	2,724,558
Grade 8	
Mathematics Type Course	
1. Eight Grade Mathematics	1,018,743
2. Pre-Algebra	714,925
3. Algebra	639,393
4. Other	168,665
Total	2,541,727
Science Type Course	
1. Earth Sciences only	737,898
2. Physical Sciences only or Earth Science and Physical Science	525,048
3. Other	1,286,851
Total	2,549,797

[1] Numbers may not add up exactly due to rounding.

Table 10-14

Percentiles of Raking Adjustments

Distribution	Grade 4 Mathematics	Grade 8 Mathematics	Grade 8 Science
Minimum	0.587	0.708	0.721
10th Percentile	0.699	0.741	0.810
25th Percentile	0.777	0.837	0.847
Median	0.891	0.958	0.983
75th Percentile	1.025	1.074	1.161
90th Percentile	1.119	1.230	1.409
Maximum	1.524	1.728	2.355

10.2.5.2 School Weights

The sampling procedures used to obtain national probability samples of assessed students also gave rise indirectly to several national probability samples of schools (from which the students were subsequently sampled). So that the school samples can be utilized for making national estimates about schools, appropriate nonresponse adjusted survey weights have been developed.

For the first time in 1996, the school weights for the main assessments were computed separately by subject within grade. The school weights were a direct byproduct of the student weighting process. The weight for school i in session h is given by

$$W_{hi} = PSUWT_i \bullet SCHWT_i \bullet SESSWT_{hi} \bullet SESNRF_{hi} \bullet SCHPSF_{hi}$$

where $PSUWT_i$, $SCHWT_i$, $SESSWT_{hi}$, $SESNRF_{hi}$, and $SCHPSF_{hi}$ are defined in Section 10.2.1.

The school weights for the long-term trend assessments in 1996 were computed using the same procedures used in earlier years. The weights were computed separately by age class. The school base weight was the product of *PSUWT* and *SCHWT*. School nonresponse adjustments were then applied to these base weights. The values of the adjustment factors are not subject specific. In fact, they are identical to the school nonresponse adjustment factors used for excluded students. Schools that did not participate in any of the sessions that they were assigned were treated as nonrespondents, but schools that conducted at least one of their assigned sessions were treated as respondents.

Fifteen samples of schools were weighted to be nationally representative in the main assessments, and three samples were weighted to be nationally representative in the long-term trend assessments. In the main samples, the population of schools represented is that of schools with grade 4 (for the grade 4 assessments), grade 8 (for the grade 8 assessments), or grade 12 (for the grade 12 assessments). In the long-term trend samples, the school population at age class 9 is that of schools having eligible students and at least one of the grades 2 through 5, the school population at age class 13 is that of schools having eligible students and at least one of the grades 6 through 9, while the school population at age class 17 is that of schools having eligible students and at least one of the grades 9 through 12.

10.2.5.3 Jackknife Replicate Weights

In addition to the weights that were used to derive all estimates of population and subpopulation characteristics, other sets of weights, called jackknife replicate weights, were derived to facilitate the estimation of sampling variability by the jackknife variance estimation technique. These weights and the jackknife estimator are discussed in the next section.

10.3 PROCEDURES USED BY NAEP TO ESTIMATE SAMPLING VARIABILITY

A major source of uncertainty in the estimation of the value in the population of a variable of interest exists because information about the variable is obtained on only a sample from the population. To reflect this fact, it is important to attach to any statistic (e.g., a mean) an estimate of the sampling variability to be expected for that statistic. Estimates of sampling variability provide information about how much the value of a given statistic would be likely to change if the statistic had been based on another, equivalent, sample of individuals drawn in exactly the same manner as the achieved sample.

Another important source of variability is that due to imprecision in the measurement of individual proficiencies. For the 1996 assessment, proficiencies in all subject areas were summarized through item response theory (IRT) models, but not in the way that these models are used in standard applications where each person responds to enough items to allow for precise estimation of that person's proficiency. In NAEP, each individual responds to relatively few items so that individual proficiency values are not well determined. Consequently, the variance of any statistic based on proficiency values has a component due to the imprecision in the measurement of the proficiencies of the sampled individuals in addition to a component measuring sampling variability. The estimation of the component of variability due to measurement imprecision and its effect on the total variability of statistics based on proficiency values are discussed in Chapter 11.

The estimation of the sampling variability of any statistic must take into account the sample design. In particular, because of the effects of cluster selection (students within schools, schools within PSUs) and because of effects of nonresponse and poststratification adjustments, observations made on different students cannot be assumed to be independent of each other (and are, in fact, generally positively correlated). Furthermore, to account for the differential probabilities of selection (and the various adjustments), each student has an associated sampling weight, which should be used in the computation of any statistic and which is itself subject to sampling variability. Ignoring the special characteristics of the sample design and treating the data as if the observations were independent and identically distributed, will generally produce underestimates of the true sampling variability, due to the clustering and unequal sampling weights.

The proper estimation of the sampling variability of a statistic based on the NAEP data is complicated and requires techniques beyond those commonly available in standard statistical packages. Fortunately, the *jackknife* procedure (see, e.g., Wolter, 1985; Kish & Frankel, 1974; Rust, 1985) provides good quality estimates of the sampling variability of most statistics, at the expense of increased computation, and can be used in concert with standard statistical packages to obtain a proper estimate of sampling variability.

The jackknife procedure used by NAEP has a number of properties that make it particularly suited for the analysis of NAEP data. When properly applied, a jackknife estimate of the variability of a linear estimator (such as a total) will be the same as the standard textbook variance estimate specified for the sample design (if the first-stage units were sampled with replacement and approximately so otherwise). Additionally, if the finite sampling corrections for the first stage units can be ignored, the jackknife produces asymptotically consistent variance estimates for statistics such as ratios, regression estimates or weighted means and for any other nonlinear statistic that can be expressed as a smooth function of estimated totals of one or more variables (Krewski & Rao, 1981).

Through the creation of student replicate weights (defined below), the jackknife procedure allows the measurement of variability attributable to the use of poststratification and other weight adjustment factors that are dependent upon the observed sample data. Once these replicate weights are derived, it is a straightforward matter to obtain the jackknife variance estimate of any statistic.

The jackknife procedure in this application is based upon the development of a set of jackknife replicate weights for each assessed student (or excluded student, or school depending upon the file involved). The replicate weights are developed in such a way that, when utilized as described below, approximately unbiased estimates of the sampling variance of an estimate result, with an adequate number of degrees of freedom to be useful for purposes of making inferences about the parameter of interest.

The estimated sampling variance of a parameter estimator t is the sum of M squared differences (where M is the number of replicate weights developed):

$$\hat{Var}(t) = \sum_{i=1}^{M} (t_i - t)^2,$$

where t_i denotes the estimator of the parameter of interest, obtained using the ith set of replicate weights, *SRWTi*, in place of the original sample of full sample estimates *WT*.

For each of the three sample types (see Section 3.4 and Chapter 5 for a description of the three sample types) in the main assessment samples, 62 replicate weights were developed using the procedures outlined below. Similar procedures were followed for the long term trend samples. However, since those samples were based on fewer PSUs (52 rather than 94), the long-term trend samples have fewer replicate weights (36 instead of 62). Full details of the generation of replicate weights for all samples are given in Wallace and Rust (1999).

Of the 62 replicate weights formed for each record from a main assessment sample, 36 act to reflect the amount of sampling variance contributed by the noncertainty strata of PSUs, with the remaining 26 replicate weights reflecting the variance contribution of the certainty PSU samples.

The derivation of the 36 replicate weights reflecting the variance of the noncertainty PSUs involves first defining pairs of PSUs in a manner that models the design as one in which two PSUs are drawn with replacement per stratum. This definition of pairs is undertaken in a manner closely reflective of the actual design, in that PSUs are pairs that are drawn from strata within the same subuniverse, and with similar stratum characteristics. The same definition of pairs was used for each of the age/grade classes in the main assessment, since all were drawn from the same sample of noncertainty PSUs. The 72 noncertainty PSUs, drawn one from each of 72 strata, were formed into 36 pairs of PSUs, where the pairs were composed of PSUs from adjacent strata within each subuniverse (thus the strata were relatively similar on socioeconomic characteristics such as proportion minority population, population change since 1980, per capita income, educational attainment, and unemployment rate). Whereas the actual sample design was to select one PSU with probability proportional to size from each of 72 strata, for variance estimation purposes the design is regarded as calling for the selection of two PSUs with probability proportional to size with replacement from each of 36 strata. This procedure likely gives a small positive bias to estimates of sampling error.

The student replicate weight for the i^{th} pair of noncertainty PSUs, for the 36 pairs corresponding to values of i from 1 to 36, is computed as follows:

1. Let W_B be the base weight of a student, as described in Section 10.2.1, which accounts for the various components of the selection probability for the student.

2. At random, one PSU in each pair is denoted as PSU number 1, while the other is denoted as PSU number 2. The i^{th} replicate base weight W_{bi} is given by:

$$W_{bi} = \begin{cases} 0 & \text{if the student belongs to PSU number 1 of pair } i \\ 2 * W_B & \text{if the student belongs to PSU number 2 of pair } i \\ WB & \text{if the student is from neither PSU in pair } i \end{cases}$$

3. The i^{th} student replicate weight $SRWT_i$ is obtained by applying the various school and student nonresponse adjustments, the weight trimming, and the poststratification to the i^{th} set of replicate base weights, using procedures identical to those used to obtain the final student weights WT from the set of base weights W_B.

In brief, the procedure for deriving the sets of W_{bi} values from the W_B values reflects the sampling of PSUs, schools, sessions, and students. By repeating the various weight adjustment procedures in each set of replicate base weights, the impact of these procedures on the sampling variance of the estimator, t, is appropriately reflected in the variance estimator $\hat{Var}(t)$ defined above.

The procedure for obtaining the 26 sets of replicate weights to estimate the sampling variance from the certainty PSUs is analogous, but somewhat more complex. The first stage of sampling in this case is at the school level, and the derivation of replicate weights must reflect appropriately the sampling of schools within certainty PSUs. Since each of the three grade classes in the main assessment involved different samples of schools, the procedure for forming replicate base weights was individualized to each of these sample components. In common across these three samples were the 22 certainty PSUs used, and the fact that 26 replicate weights were formed in each case.

For a given sample, the 22 certainty PSUs constituted strata, with a sample of schools drawn systematically within each. Using the schools listed in order of sample selection within each stratum, successive schools were paired or formed into triples. These pairs and triples numbered more than 26, so that each replicate weight was in general formed by perturbing the weights of students from more than a single pair or triple. These aggregates of pairs and triples were in general assigned in proportion to the size of the PSU. Thus generally speaking, the largest PSUs were assigned three replicates each, the next largest were assigned two replicates each, and the remaining self-representing PSUs were assigned one replicate each. When splitting the larger PSUs, the schools were split into groups of (as close as possible) equal size, based on the ordering at the time of sample selection. One group was assigned to each replicate. Within each PSU (or partial PSU in the case of the large split PSUs) schools were alternately numbered 1 or 2 starting randomly. If, however, there were exactly three schools sampled in the PSU the schools were randomly numbered 1, 2, or 3. The method of forming replicate base weights in strata where there were not exactly three schools was the same as for the noncertainty strata (except that members of a pair, *i*, could come from more than a single "stratum").

When a stratum contained three schools, students in these schools had their weights perturbed for two sets of replicates, say *i*1 and *i*2, as follows:

$$W_{hi1} = \begin{cases} 0 & \text{if the student is in school number 1 of a PSU belonging to set } i \\ 1.5 * W_{hi} & \text{if the student is in school number 2 or 3 of a PSU belonging to set } i \\ W_{hi} & \text{if the student does not belong to a PSU in set } i \end{cases}$$

$$W_{hi2} = \begin{cases} 1.5 * W_{hi} & \text{if the student is in school number 1 or 2 of a PSU belonging to set } i \\ 0 & \text{if the student is in school number 3 of a PSU belonging to set } i \\ W_{hi} & \text{if the student does not belong to a PSU in set } i \end{cases}$$

The actual pattern of replicate base weight assignment used for each of the samples is given in Wallace and Rust (1999).

The nonresponse, trimming, and poststratification adjustments were applied to each set of replicate base weights to derive the final replicate weights in each case, exactly as in the noncertainty PSUs. In fact these procedures were applied to the full set of weights from all parts of the given sample together, just as for the full sample weights. That is, for example, poststratification factors were derived from the full set of data for each replicate, not separately for certainty and noncertainty PSUs.

This estimation technique was used by NAEP to estimate all sampling errors presented in the various reports. A further discussion of the variance estimation procedure used by NAEP, including a discussion of alternative jackknife estimators that were also considered, appears in Johnson (1989).

We noted above (as discussed in Chapter 11) that a separate estimate of the contribution to variance due to the imprecision in the measure of individual proficiencies is made and added to the jackknife estimate of variance. That variance component could have been approximately reflected in the jackknife variance estimates simply by separately applying the IRT computations to each jackknife replicate. Because of the heavier IRT computational load, this was not done. Less work was involved by the simple procedure of making separate estimates of this component to be added to the jackknife variance estimates. Also, a separate measure of this component of variance is then available, which would not be so if it were reflected in the jackknife variance estimate.

10.4 APPROXIMATING THE SAMPLING VARIANCE USING DESIGN EFFECTS

In practical terms, the major expenditure of resources in the computation of a jackknife variance estimate occurs in the preparation of estimates for each of the pseudoreplicates. In the 1996 assessment, this implies that the statistic of interest has to be recomputed up to 63 times, once for the overall estimate t, and once for each of the up to 62 pseudoreplicates ti. Because this is a considerable increase in the amount of computation required, relative to a conventional variance estimate, it is of interest to see how much the jackknife variance estimates differ from their less computationally intensive, simple random sampling based, analogues.

The comparison of the conventional and the jackknife methods of variance estimation will be in terms of a statistic called the design effect, which was developed by Kish (1965) and extended by Kish and Frankel (1974). The design effect for a statistic is the ratio of the actual variance of the statistic (taking the sample design into account) over the conventional variance estimate based on a simple random sample with the same number of elements. The design effect is the inflation factor to be applied to the conventional variance estimate in order to adjust error estimates based on simple random sampling assumptions to account approximately for the effect of the sample design. The value of the design effect depends on the type of statistic computed and the variables considered in a particular analysis as well as the combined clustering, stratification, and weighting effects occurring among sampled elements. While stratification drives down the sampling variance, the effects of clustering and weighting that drive variances up are generally sufficient to produce variance estimates that are larger than variances based on simple random sampling assumptions. Consequently, the design effects will be greater than one. In NAEP, the underestimates are the result of ignoring the effects of clustering and unequal probabilities of selection in the variance calculations.

Since most of the analyses conducted by NAEP are based on the results of scaling models that summarize performance of students across a learning area, we consider the design effects to be expected for analyses based on these scale scores. For reasons given in Chapter 11, NAEP provides each individual with a set of "plausible values," each of which is a random draw from the distribution of the potential scale scores for that individual. Since our current interest is on the effect of the sampling design on estimation and inference, we will restrict our attention to a single measure of an individual's proficiency, the first plausible value of the individual's scale score.

A key statistic of interest is the estimated mean proficiency of a subgroup of the population. An estimate of the subgroup mean proficiency is the weighted mean of the first plausible values of proficiency of the sampled individuals who belong to the subpopulation of interest. Let $\overline{Y}$ be the weighted mean of the plausible values of the sampled members of the subpopulation. The conventional estimate of the variance of $\overline{Y}$ is

$$Var_{con}\left(\overline{Y}\right)=\frac{\sum_{i=1}^{N} w_i\left(y_i-\overline{Y}\right)^2}{N\,W_+},$$

where N is the total number of sampled individuals in the subpopulation for which plausible values are available, w_i is the weight of the i^{th} individual, y_i is a plausible value from the distribution of potential proficiencies for that individual, and W_+ is the sum of the weights across the N individuals.

The design effect for the subgroup mean proficiency estimate is

$$deff(\overline{Y}) = Var_{JK}(\overline{Y}) / Var_{con}(\overline{Y})$$

where $VAR_{JK}(\overline{Y})$ is the jackknife variance of $\overline{Y}$. (As has been pointed out previously, $VAR_{JK}(\overline{Y})$ as computed does not measure the variability of $\overline{Y}$ due to imprecision in the measurement of the proficiencies of the sampled individuals. The estimation of this very important source of variability is discussed in Chapter 11.) Of the factors that determine $deff(\overline{Y})$, the effects of stratification are usually less than one, which means the efficiency of a stratified sampling is better than a simple random sampling; whereas the clustering effects are always larger than one. The clustering effects can be approximated by

$$1 + (\overline{m} - 1)\rho,$$

where $\overline{m}$ is the average cluster size and ρ is the intracluster correlation (Cochran, 1977). Therefore, the large cluster size or large intracluster correlation will inflate the clustering effects.

Values of the design effects for subgroup mean proficiencies are displayed, by grade, in Tables 10-15 and 10-19 for the 1996 main assessments of mathematics and science respectively. Design effects are shown for the population as a whole (Total) as well as for a variety of demographic subgroups: gender; race/ethnicity (White, Black, Hispanic, Asian/Pacific Islander, other); type of location (Central City, Urban Fringe/Large Town, Rural/Small Town); parental education (did not graduate high school, graduated high school, post-high school, graduated college, unknown); and type of school (public, nonpublic). These particular demographic variables were selected because (1) they are major variables in NAEP reports and (2) they reflect different types of divisions of the population that might have different levels of sampling variability. Note that the tables of the design effects provided in the NAEP Technical Reports previous to 1994 are computed for the mean item scores, proportion-correct statistics, which can not be compared with the design effects for proficiency scale scores directly.

The 1996 main mathematics assessment contains the three sample types S1, S2 and S3 (see Section 5.3). To conserve trend in the main mathematics assessment, the reporting samples were made up of A1 and B1 portions in S1 samples and A2 in S2 samples (see Table 10-1). The advantage of including A2 in the reporting samples is to obtain more accurate scale scores, yet a trade-off is that the clustering effects for the reporting samples becomes lager than the clustering effects for only sample S1.

The larger intracluster correlation in A1 and A2 and larger cluster sizes in sample type S1 are two factors that contribute to the increase in clustering effects. First, the reporting sample for the main mathematics assessment from sample type S2 has only non-SD/LEP students, A2. Compared with the SD/LEP students, the non-SD/LEP students are relative homogenous in scale scores. The high homogeneity in clusters implies a large intracluster correlation, ρ 1. Given other conditions, the large clustering effects that are due to a large intracluster correlation expand the design effects in the reporting samples. To check this conclusion, the design effects for subsamples of A1, A2, and B1 were calculated separately and are displayed in Tables 10-16, 10-17 and 10-18. The estimated design effects for subsamples of A1 and A2 are much larger than those for subsample B1 that contains SD/LEP students in sample type S1. Secondly, the cluster sizes tended to be larger in sample type S1 because the schools in sample type S1 only provided samples for the main mathematics assessment, whereas the schools in sample type S2 provided samples for both the main mathematics and science assessments. Therefore, the design effects in A1 are found to be larger than the design effects in A2 and both subsamples of A1 and A2 contributed students to the reporting samples.

Tables 10-20 and 10-21 provide equivalent information for the long-term trend samples. Table 10-20 provides, for each age class and demographic subgroup, the average of the design effects for mean reading and writing proficiencies for the students selected for the long-term trend assessments of reading and writing. Table 10-21 provides the average of the design effects for the mean mathematics and science proficiencies for the students selected for the long-term trend assessments of mathematics and science.

Finally, for comparison with the national mathematics and science results, Table 10-22 shows the average design effects for state-level mean mathematics proficiency, averaged across all jurisdictions participating in the grade 4 and grade 8 1996 State Assessment in mathematics. The results in Table 10-23 are the average design effects for state-level mean science proficiency, averaged across all jurisdictions participating in the grade 8 1996 State Assessment in science.

The tables show that the design effects are predominantly larger than 1, indicating that standard variance estimation formulas will be generally too small, usually markedly so. Although the design effects appear somewhat different for certain subgroups of the population, they are, perhaps, similar enough (at least within a subject and grade) to select an overall composite value that is adequate for most purposes. In choosing a composite design effect, some consideration must be made about the relative consequences of overestimating the variance as opposed to underestimating the variance. For example, if an overestimate of the variance is viewed as severe an error as an underestimate, the composite design effect should be near to the center of the distributions of the design effects. Possible composites of this type are the mean and median design effects across the combined distribution of all design effects. Larger design effects should be used if it is felt that it is a graver error to underestimate the variability of a statistic than to overestimate it. For example, Johnson and King (1987) examine estimation of variances using design effects (among other techniques) under the assumption that the consequences of an underestimate are three times as severe as those of an overestimate of the same magnitude. Adopting a loss function that is a weighted sum of absolute values of the deviations of predicted from actual with underestimates receiving three times the weight of overestimates, produces the upper quartile of the design effects as the composite value. This assumes that the distribution of design effects is roughly independent of the jackknife estimates of variance, so that the size of a design effect does not depend on the size of the variance.

Table 10-24 gives the values of these potential composites, by grade, for the mathematics and science assessments, and across those assessments. Tables 10-25 and 10-26 gives composite values for the 1996 State Assessment of mathematics (grades 4 and 8), and the 1996 State Assessment of science (grade 8), respectively. Table 10-27 shows composite values for the 1996 State Assessment of mathematics and the 1996 State Assessment of science, combined. The state assessments tend to have smaller design effects than the matching national assessment, due to the lesser degree of clustering in the state assessment samples (i.e., the average cluster size of $\overline{m}$ is smaller). Table 10-28 gives the values of the composites for the two long-term trend samples.

We note that the $Var_{con}(\overline{Y})$ as defined above is an estimate of S^2/N where S^2 represents the unit variance for a simple random sample for the population of students from which the sample is drawn. This is an appropriate estimate of the increase in variance over simple random sampling from that population due to the effects of weighting. However, the computer packages used for estimating the variance may not reflect the weights in estimating the unit variance, as given above, but instead may provide an estimate of a unit variance of the form

$$\frac{\sum_{i=1}^{N}\left(y_i-\overline{Y}\right)^2}{N^2}.$$

In this case, the unweighted estimate of unit variance would be appropriate for the denominator of a design effect measure of the increase in variance over the unit variance as estimated by the computer package. If there is no correlation between the w_i and y_i, there would be little difference between the two.

Table 10-15

Design Effects by Demographic Subgroup and Grade for Mean Mathematics Proficiencies[1]

Subgroup	Grade 4	Grade 8	Grade 12
Total	5.00	5.82	6.50
Male	3.28	4.48	3.50
Female	3.19	3.13	4.56
White	4.74	5.92	5.14
Black	6.32	3.89	5.95
Hispanic	4.04	2.72	2.42
Asian/Pacific Islander	3.86	4.45	6.21
Other race/ethnicity	1.46	1.09	15.38
Urban	9.29	7.27	11.53
Suburban	7.10	10.50	6.36
Rural	6.09	5.92	8.00
PARED < HS	1.54	1.33	1.59
PARED = HS	2.12	1.89	2.28
PARED > HS	1.18	2.34	1.31
PARED = College	4.76	5.05	5.17
PARED = Unknown	4.36	1.13	1.06
Public school	5.24	5.87	4.42
Nonpublic school	7.00	8.53	18.24

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-16

Design Effects of Subsample A1 by Demographic Subgroup and Grade for Mean Mathematics Proficiencies[1]

Subgroup	Grade 4	Grade 8	Grade 12
Total	9.38	7.33	7.48
Male	5.61	5.04	4.62
Female	4.95	4.13	4.14
White	5.13	6.89	5.21
Black	15.14	3.93	7.63
Hispanic	2.08	2.86	1.91
Asian/Pacific Islander	2.46	7.96	4.54
Other race/ethnicity	1.12	0.96	30.13
Urban	16.94	6.13	12.20
Suburban	6.84	15.34	5.72
Rural	8.25	8.01	13.42
PARED < HS	1.28	1.55	1.03
PARED = HS	2.70	1.76	2.74
PARED > HS	1.32	2.28	1.57
PARED = College	7.92	7.96	5.88
[2]PARED = Unknown	—	—	—
Public school	9.49	7.07	5.43
Nonpublic school	12.24	9.18	20.54

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

[2] Insufficient data to compute design effects

Table 10-17

Design Effects of Subsample A2 by Demographic Subgroup and Grade for Mean Mathematics Proficiencies[1]

Subgroup	Grade 4	Grade 8	Grade 12
Total	7.95	3.98	5.98
Male	4.75	3.50	3.19
Female	4.78	2.02	5.32
White	4.39	3.95	3.50
Black	3.43	1.80	1.92
Hispanic	3.26	2.31	3.00
Asian/Pacific Islander	3.92	2.07	1.61
Other race/ethnicity	0.60	1.41	2.05
Urban	7.25	6.77	5.53
Suburban	13.77	4.80	5.36
Rural	4.24	4.25	3.94
PARED < HS	1.44	1.52	1.76
PARED = HS	1.81	2.18	1.41
PARED > HS	1.19	0.92	1.89
PARED = College	5.55	2.10	3.27
[2]PARED = Unknown	—	—	—
Public school	7.79	4.02	5.08
Nonpublic school	5.99	7.58	6.08

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

[2] Insufficient data to compute design effects

Table 10-18

Design Effects of Subsample B1 by Demographic Subgroup and Grade for Mean Mathematics Proficiencies[1]

Subgroup	Grade 4	Grade 8	Grade 12
Total	2.88	1.23	1.77
Male	2.42	1.38	1.38
Female	1.31	1.15	1.98
White	1.95	1.54	1.10
Black	1.60	0.98	1.77
Hispanic	3.73	0.81	0.78
Asian/Pacific Islander	1.90	0.80	8.32
Other race/ethnicity	0.87	1.13	13.01
Urban	3.96	1.26	1.91
Suburban	2.76	1.55	1.19
Rural	1.67	1.27	1.86
PARED < HS	1.38	0.69	1.46
PARED = HS	1.46	0.98	0.89
PARED > HS	1.21	0.98	1.21
PARED = College	1.45	2.00	0.72
[2]PARED = Unknown	—	—	—
Public school	2.85	1.10	1.49
Nonpublic school	0.31	0.35	5.99

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

[2] Insufficient data to compute design effects

Table 10-19

Design Effects by Demographic Subgroup and Grade for Mean Science Proficiencies[1]

Subgroup	Grade 4	Grade 8	Grade 12
Total	3.83	4.98	4.80
Male	2.43	3.35	3.77
Female	2.43	4.23	3.25
White	3.71	5.09	4.73
Black	4.17	2.01	2.79
Hispanic	3.08	3.57	4.60
Asian/Pacific Islander	4.00	3.07	2.81
Other race/ethnicity	2.45	2.38	2.18
Urban	11.40	7.17	11.86
Suburban	13.97	8.51	8.60
Rural	6.17	6.66	5.07
PARED < HS	1.23	1.75	1.91
PARED = HS	1.79	2.35	3.11
PARED > HS	1.16	1.66	2.43
PARED = College	2.64	4.50	2.95
PARED = Unknown	2.77	3.72	1.74
Public school	3.97	4.43	4.94
Nonpublic school	5.23	9.31	6.96

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-20

Design Effects by Demographic Subgroup and Age Averaged Over Mean Reading and Writing Proficiencies for the Reading and Writing Long-Term Trend Samples[1]

Subgroup	Age 9	Age 13	Age 17
Total	1.86	2.13	2.13
Male	1.08	1.81	1.79
Female	2.00	1.85	2.08
White	1.51	1.24	1.84
Black	1.31	3.93	2.48
Hispanic	2.17	1.98	1.21
Asian/Pacific Islander	1.53	1.78	2.22
Other race/ethnicity	1.23	1.75	3.75
Urban	2.16	6.65	2.58
Suburban	3.37	4.35	2.08
Rural	3.74	3.33	8.14
PARED < HS	0.89	1.66	1.06
PARED = HS	1.68	1.09	1.03
PARED > HS	1.12	1.22	1.86
PARED = College	1.21	2.09	1.42
PARED = Unknown	2.08	2.04	0.68
Public school	2.05	1.89	2.41
Nonpublic school	1.96	2.28	2.16

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-21

Design Effects by Demographic Subgroup and Age Averaged Over Mean Mathematics and Science Proficiencies for the Mathematics and Science Long-Term Trend Samples[1]

Subgroup	Age 9	Age 13	Age 17
Total	3.02	3.54	2.04
Male	2.88	1.76	1.86
Female	1.37	2.83	1.45
White	2.49	3.95	2.04
Black	2.83	1.79	1.17
Hispanic	2.06	2.06	1.75
Asian/Pacific Islander	2.29	2.72	1.71
Other race/ethnicity	1.79	2.18	1.8
Urban	4.42	6.18	5.16
Suburban	4.36	7.73	2.42
Rural	6.32	8.52	6.35
PARED < HS	0.84	2.09	1.8
PARED = HS	1.51	1.79	2.39
PARED > HS	1.88	1.08	1.7
PARED = College	2.67	2.14	1.77
PARED = Unknown	0.71	1.86	1.47
Public school	2.72	3.57	1.86
Nonpublic school	4.36	10.89	4.74

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-22

Average Design Effects by Demographic Subgroup for Mean State Mathematics Proficiencies Averaged Across State Samples[1]

Subgroup	Grade 4	Grade 8
Total	4.15	3.45
Male	2.65	2.36
Female	2.66	2.36
White	3.06	2.56
Black	1.98	1.93
Hispanic	1.84	1.59
Asian/Pacific Islander	1.57	1.40
Other race/ethnicity	1.63	1.76
Urban	5.99	4.88
Suburban	4.23	3.59
Rural	4.19	3.08
PARED < HS	1.37	1.26
PARED = HS	1.65	1.79
PARED > HS	1.37	1.44
PARED = College	2.89	2.37
PARED = Unknown	2.13	1.47
Public school	4.02	3.42
Nonpublic school	7.06	5.60

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-23

Average Design Effects by Demographic Subgroup for Mean State Science Proficiencies Averaged Across State Samples[1]

Subgroup	Grade 8
Total	3.53
Male	2.43
Female	2.33
White	2.55
Black	1.92
Hispanic	1.63
Asian/Pacific Islander	1.34
Other race/ethnicity	1.70
Urban	5.13
Suburban	3.52
Rural	2.99
PARED < HS	1.34
PARED = HS	1.75
PARED > HS	1.45
PARED = College	2.26
PARED = Unknown	1.51
Public school	3.41
Nonpublic school	6.50

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Table 10-24

Within-Grade Mean, Median, and Upper Quartile of the Distribution of Design Effects for National Main Assessments by Subject Area and Across Subject Areas

Statistic	Grade 4	Grade 8	Grade 12
Mean Mathematics Proficiencies (Distribution Across Demographics Subgroups)			
Upper Quartile	6.09	5.92	6.50
Mean	4.48	4.52	6.09
Median	4.88	5.44	6.08
Mean Science Proficiencies (Distribution Across Demographics Subgroups)			
Upper Quartile	4.17	5.09	4.94
Mean	4.25	4.37	4.36
Median	3.90	4.47	4.67
Across Subject Areas (Distribution Across Subject Areas and Demographic Subgroups)			
Upper Quartile	5.24	5.92	6.36
Mean	4.36	4.45	5.23
Median	3.92	4.33	4.58

Table 10-25

Mean, Median, and Upper Quartile of the Across-State Average Design Effects for Mean State Mathematics Proficiency (Distribution Across Demographic Subgroups)

Statistics	Grade 4	Grade 8
Upper Quartile	4.15	3.42
Mean	3.02	2.57
Median	2.66	2.36

Table 10-26

Mean, Median, and Upper Quartile of the Across-State Average Design Effects for Mean State Science Proficiency (Distribution Across Demographic Subgroups)

Statistics	Grade 8
Upper Quartile	3.41
Mean	2.63
Median	2.30

Table 10-27

Mean, Median, and Upper Quartile of the Across-State Average Design Effects for Mean State Proficiency (Distribution Across Demographic Subgroups and Across Subjects)

Statistics	Grade 4	Grade 8
Upper Quartile	4.15	3.42
Mean	3.02	2.60
Median	2.66	2.35

Table 10-28

Mean, Median, and Upper Quartile of the Distribution of Design Effects for the Long-Term Trend Samples[1]

Statistic	Age 9	Age 13	Age 17
Reading and Writing Long-Term Trend (Distribution Across Demographic Subgroups of Average of Design Effects for Reading and Writing Mean Proficiencies)			
Upper Quartile	2.08	3.09	2.48
Mean	1.81	2.44	2.40
Median	1.67	1.94	2.08
Mathematics and Science Long-Term Trend (Distribution Across Demographic Subgroups of Average of Design Effects for Mathematics and Science Mean Proficiencies)			
Upper Quartile	3.02	3.95	2.39
Mean	2.70	3.70	2.42
Median	2.58	2.45	1.83

[1] Design effects are based on the conventional and jackknife variances of subgroup means of the first plausible values of proficiency.

Chapter 11

SCALING PROCEDURES[1]

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11.1 INTRODUCTION

The primary method by which results from the 1996 National Assessment of Educational Progress (NAEP) were disseminated was scale-score reporting. With scaling methods, the performance of a sample of students in a subject area or subarea can be summarized on a single scale or series of scales even when different students have been administered different items. This chapter presents an overview of the scaling methodologies employed in the analyses of the data from NAEP surveys in general and from the 1996 assessment in particular. Details of the scaling procedures specific to the subject areas of science, mathematics, reading, and writing are presented in Chapters 12 through 17.

11.2 BACKGROUND

The basic information from an assessment consists of the responses of students to the items presented in the assessment. For NAEP, these items are constructed to measure performance on sets of objectives developed by nationally representative panels of learning area specialists, educators, and concerned citizens. Satisfying the objectives of the assessment and ensuring that the tasks selected to measure each goal cover a range of difficulty levels typically require many items. For example, the mathematics assessment required 164 items at grade 8. Depending on the subject areas, a mixture of multiple-choice, short constructed-response, and extended constructed-response items were used. Multiple-choice and short constructed-response items were used in all assessments but writing. Extended constructed-response items, scored on a multipoint scale, were presented in the main mathematics and science assessments and in the long-term trend writing assessment. To reduce student burden, each assessed student was presented only a fraction of the full pool of items through multiple matrix sampling procedures.

The most direct manner of presenting the assessment results is to report separate statistics for each item. However, because of the vast amount of information, having separate results for each of the items in the assessment pool hinders the comparison of the general performance of subgroups of the population. Item-by-item reporting masks similarities in trends and subgroup comparisons that are common across items.

An obvious summary of performance across a collection of items is the average of the separate item scores. The advantage of averaging is that it tends to cancel out the effects of peculiarities in items that can affect item difficulty in unpredictable ways. Furthermore, averaging makes it possible to compare more easily the general performances of subpopulations.

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[1] Nancy L. Allen is responsible for the psychometric and statistical analysis of national and state NAEP data. Eugene G. Johnson is a senior psychometrician, contributing to the design of NAEP and to discussions of sampling issues. Previously he was responsible for the psychometric and statistical analysis of NAEP data. Robert J. Mislevy is a technical consultant contributing in the area of item response theory. Neal Thomas was a technical consultant to the NAEP analysis staff, contributing in the area of imputed values.

Despite their advantages, there are a number of significant problems with average item scores. First, the interpretation of these results depends on the selection of the items; the selection of easy or difficult items could make student performance appear to be overly high or low. Second, the average score is related to the particular items comprising the average, so that direct comparisons in performance between subpopulations require that those subpopulations have been administered the same set of items. Third, because this approach limits comparisons to average scores on specific sets of items, it provides no simple way to report trends over time when the item pool changes. Finally, direct estimates of parameters or quantities such as the proportion of students who would achieve a certain score across the items in the pool are not possible when every student is administered only a fraction of the item pool. While the average score across all items in the pool can be readily obtained (as the average of the individual item scores), statistics that provide distributional information, such as quantiles of the distribution of scores across the full set of items, cannot be readily obtained without additional assumptions.

These limitations can be overcome by the use of response scaling methods. If several items require similar skills, the regularities observed in response patterns can often be exploited to characterize both respondents and items in terms of a relatively small number of variables. These variables include a respondent-specific variable, called proficiency, which quantifies a respondent's tendency to answer items correctly (or, for multipoint items, to achieve a certain score) and item-specific variables that indicate characteristics of the item such as its difficulty, effectiveness in distinguishing between individuals with different levels of proficiency, and the chances of a very low proficiency respondent correctly answering a multiple-choice item. (These variables are discussed in more detail in the next section.) When combined through appropriate mathematical formulas, these variables capture the dominant features of the data. Furthermore, all students can be placed on a common scale, even though none of the respondents takes all of the items within the pool. Using the common scale, it becomes possible to discuss distributions of proficiency in a population or subpopulation and to estimate the relationships between proficiency and background variables.

It is important to point out that any procedure of aggregation, from a simple average to a complex multidimensional scaling model, highlights certain patterns at the expense of other potentially interesting patterns that may reside within the data. Every item in a NAEP survey is of interest and can provide useful information about what young Americans know and can do. The choice of an aggregation procedure must be driven by a conception of just which patterns are salient for a particular purpose.

The scaling for the main assessments in mathematics and science was carried out separately within the content strands or fields specified in the frameworks for those subjects, respectively. This scaling within subareas was done because it was anticipated that different patterns of performance or different trends over time might exist for these essential subdivisions of the subject areas. By creating a separate scale for each of these content areas, potential differences in subpopulation performance between the content areas are preserved.

The creation of a series of separate scales to describe performance within a subject area does not preclude the reporting of a single index of overall performance in the subject area—that is, an overall subject area composite. A composite is computed as the weighted average of the content area scales, where the weights correspond to the relative importance given to each content area as defined by the framework. The composite provides a global measure of performance within the subject area, while the constituent content area scales allow the measurement of important interactions within educationally relevant subdivisions of the subject area.

11.3 SCALING METHODOLOGY

This section reviews the scaling models employed in the analyses of data of the 1996 assessment, and the multiple imputation or "plausible values" methodology that allows such models to be used with NAEP's sparse item-sampling design. The reader is referred to Mislevy (1991) for an introduction to plausible values methods and a comparison with standard psychometric analyses, to Donoghue (1994), Mislevy, Johnson and Muraki (1992), and Beaton and Johnson (1992) for additional information on how the models are used in NAEP, and to Rubin (1987) for the theoretical underpinnings of the approach. It should be noted that the imputation procedure used by NAEP is a mechanism for providing plausible values for the unobserved proficiencies and not for filling in blank responses to background or cognitive variables.

While the NAEP procedures were developed explicitly to handle the characteristics of NAEP data, they build on other research, and are paralleled by other researchers. See, for example Dempster, Laird, and Rubin (1977); Little and Rubin (1983, 1987); Andersen (1980); Engelen (1987); Hoijtink (1991); Laird (1978); Lindsey, Clogg, and Grego (1991); Zwinderman (1991); Tanner and Wong (1987); and Rubin (1987, 1991).

11.3.1 The Scaling Models

Three distinct scaling models, depending on item type and scoring procedure, were used in the analysis of the data from the 1996 assessment. Each of the models is based on item response theory (IRT; e.g., Lord, 1980). Each is a "latent variable" model, defined separately for each of the scales, which expresses respondent's tendencies to achieve certain scores (such as correct/incorrect) on the items contributing to a scale as a function of a parameter that is not directly observed, called proficiency on the scale.

A three-parameter logistic (3PL) model was used for the multiple-choice items (which were scored correct/incorrect). The fundamental equation of the 3PL model is the probability that a person whose proficiency on scale k is characterized by the *unobservable* variable θ_k will respond correctly to item j:

$$P(x_j = 1 | \theta_k, a_j, b_j, c_j) = c_j + \frac{(1 - c_j)}{1 + \exp[-1.7 a_j(\theta_k - b_j)]} \equiv P_{j1}(\theta_k), \qquad (11.1)$$

where

x_j is the response to item j, 1 if correct and 0 if not;

a_j where $a_j > 0$, is the slope parameter of item j, characterizing its sensitivity to proficiency;

b_j is the threshold parameter of item j, characterizing its difficulty; and

c_j where $0 \le c_j < 1$, is the lower asymptote parameter of item j, reflecting the chances of students of very low proficiency selecting the correct option.

Further define the probability of an incorrect response to the item as

$$P_{j0} \equiv P\left(x_j = 0 \middle| \theta_k, a_j, b_j, c_j\right) = 1 - P_{j1}(\theta_k). \tag{11.2}$$

A two-parameter logistic (2PL) model was used for the short constructed-response items that were scored correct or incorrect. The form of the 2PL model is the same as Equations (11.1) and (11.2) with the c_j parameter fixed at zero.

In addition to the multiple-choice and short constructed-response items, a number of extended constructed-response items were presented in the assessments of mathematics and science; and only extended constructed-response items were presented in the long-term trend writing assessment. Each of these items was scored on a multipoint scale with potential scores ranging from 0 to 3 or from 0 to 4. Some short constructed-response items were scored on a three-point scale (0-2). Items that are scored on a multipoint scale are referred to as polytomous items, in contrast with the multiple-choice and short constructed-response items, which are scored correct or incorrect and referred to as dichotomous items.

The polytomous items were scaled using a generalized partial credit model (Muraki, 1992). The fundamental equation of this model is the probability that a person with proficiency θ_k on scale k will have, for the jth item, a response x_j that is scored in the ith of m_j ordered score categories:

$$P\left(x_j = i \middle| \theta_k, a_j, b_j, d_{j,1}, \ldots, d_{j,m_j-1}\right) = \frac{exp\left(\sum_{v=0}^{i} 1.7a_j(\theta_k - b_j + d_{j,v})\right)}{\sum_{g=0}^{m_j-1} exp\left(\sum_{v=0}^{g} 1.7a_j(\theta_k - b_j + d_{j,v})\right)} \equiv P_{ji}(\theta_k) \tag{11.3}$$

where

m_j is the number of categories in the response to item j

x_j is the response to item j, with possibilities $0, 1, \ldots, m_j-1$

a_j is the slope parameter;

b_j is the item location parameter characterizing overall difficulty; and

$d_{j,i}$ is the category i threshold parameter (see below).

Indeterminacies in the parameters of the above model are resolved by setting $d_{j,0} = 0$ and setting $\sum_{i=1}^{m_j-1} d_{j,i} = 0$. Muraki (1992) points out that $b_j - d_{j,i}$ is the point on the θ_k scale at which the plots of $P_{j,i-1}(\theta_k)$ and $P_{ji}(\theta_k)$ intersect and so characterizes the point on the θ_k scale at which the response to item j has equal probability of falling in response category i-1 and falling in response category i.

When $m_j = 2$, so that there are two score categories (0,1), it can be shown that $P_{ji}(\theta_k)$ of Equation (11.3) for i=0,1 corresponds respectively to $P_{j0}(\theta_k)$ and $P_{j1}(\theta_k)$ of the 2PL model (Equations (11.1) and (11.2) with c_j=0).

Close examination of the 3PL and generalized partial credit models indicate that both models have a linear indeterminacy of the theta scale. In other words, if the item parameters were estimated in a different metric, the value of θ_k could be transformed to make (11.1) and (11.3) true. For the purposes of reporting item parameter estimates and other intermediary estimates, the linear indeterminacies apparent in (11.1) and (11.3) may be resolved by an arbitrary choice of the origin and unit size in a given scale. In most cases, a provisional scale standardizing the theta distribution to have mean 0 and standard deviation 1 is employed. Final results for each content area were linearly transformed from the θ scale to a 0-to-500 (for mathematics) or a 0-to-300 scale (for science), as described in the subject area chapters in this report.

A basic assumption of item response theory is the conditional independence of the responses by an individual to a set of items, given the individual's proficiency. That is, conditional on the individual's θ_k, the joint probability of a particular response pattern $\underline{x} = (x_1,\ldots,x_n)$ across a set of n items is simply the product of terms based on (11.1), (11.2), and (11.3):

$$P(\underline{x}|\theta_k, item\ parameters) = \prod_{j=1}^{n}\prod_{i=0}^{m_j-1} P_{ji}(\theta_k)^{u_{ji}} \qquad (11.4)$$

where $P_{ji}(\theta_k)$ is of the form appropriate to the type of item (dichotomous or polytomous), m_j is equal to 2 for the dichotomously scored items, and u_{ji} is an indicator variable defined by

$$u_{ji} = \begin{cases} 1\ if\ response\ x_j\ is\ in\ category\ i \\ 0\ otherwise \end{cases}$$

It is also typically assumed that response probabilities are conditionally independent of background variables $(\underline{y})$, given θ_k, or

$$P(\underline{x}|\theta_k, item\ parameters, \underline{y}) = p(\underline{x}|\theta_k, item\ parameters). \qquad (11.5)$$

After $\underline{x}$ has been observed, equation 11.4 can be viewed as a likelihood function, and provides a basis for inference about θ_k or about item parameters. Estimates of item parameters were obtained by the NAEP BILOG/PARSCALE program, which combines Mislevy and Bock's (1982) BILOG and Muraki and Bock's (1991) PARSCALE computer programs[2], and which concurrently estimates parameters for all items (dichotomous and polytomous). Donoghue (1994) reports on the effect of having both dichotomous and polytomous items within a scale. The item parameters are then treated as known in subsequent calculations. In subject areas with multiple scales (main mathematics and science), the parameters of the items constituting each of the separate scales were estimated independently of the parameters of the other scales. Once items have been calibrated in this manner, a likelihood function for the proficiency θ_k is induced by a vector of responses to any subset of calibrated items, thus allowing θ_k-based inferences from matrix samples. The likelihood function for the proficiency θ_k is called the *posterior distribution of the thetas for each student.*

In almost all NAEP IRT analyses, missing responses at the end of each block of items a student was administered were considered "not reached," and treated as if they had not been presented to the respondent. Missing responses to dichotomous items before the last observed response in a block were considered intentional omissions, and treated as fractionally correct at the value of the reciprocal of the number of response alternatives, if the item was a multiple-choice item. These conventions are discussed by Mislevy and Wu (1988). With regard to the handling of not-reached items, Mislevy and Wu found that ignoring not-reached items introduces slight biases into item parameter estimation when not-reached items are present and speed is correlated with ability. With regard to omissions, they found that the method described above provides consistent limited-information maximum likelihood estimates of item and ability parameters under the assumption that respondents omit only if they can do no better than responding randomly.

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[2] See Muraki and Bock (1997) for the current version of PARSCALE.

Occasionally, extended constructed-response items were the last item in a block of items. Because considerably more effort was required of the student to answer these items, nonresponse to an extended constructed-response item at the end of a block was considered an intentional omission (and scored as the lowest category, 0) unless the student also did not respond to the item immediately preceding that item. In that case, the extended constructed-response item was considered not reached and treated as if it had not been presented to the student.

Although the IRT models are employed in NAEP only to summarize performance, a number of checks are made to detect serious violations of the assumptions underlying the models. Checks are made to detect multidimensionality of the construct being measured and certain condition dependencies. DIF analyses are used to examine issues of dimensionality, and what are called χ^2 statistics in the IRT literature are used to flag responses with serious departures from the IRT model. The latter statistics might better be called item fit statistics since they do not really have χ^2 distributions. These checks include comparisons of empirical and theoretical item response functions to identify items for which the IRT model may provide a poor fit to the data. When warranted, remedial efforts, such as collapsing categories of polytomous items or combining items into a single item, are made to mitigate the effects of such violations on inferences.

Scaling areas in NAEP are determined *a priori* by grouping items into content areas for which overall performance is deemed to be of interest, as defined by the frameworks developed by the National Assessment Governing Board (NAGB). A proficiency scale θ_k is defined *a priori* by the collection of items representing that scale. What is important, therefore, is that the models capture salient information in the response data to effectively summarize the overall performance on the content area of the populations and subpopulations being assessed in the content areas. NAEP has routinely conducted differential item functioning (DIF) analyses to guard against potential biases in making subpopulation comparisons based on the proficiency distributions.

The local independence assumption embodied in Equation (11.4) implies that item response probabilities depend only on θ and the specified item parameters, and not on the position of the item in the booklet, the content of items around an item of interest, or the test-administration and timing conditions. However, these effects are certainly present in any application. The practical question is whether inferences concerning aggregate performance in the scaling area that are based on the IRT probabilities obtained via (11.4) are robust with respect to the ideal assumptions underlying the IRT model. Our experience with the 1986 NAEP reading anomaly (Beaton & Zwick, 1990) has shown that for measuring small changes over time, changes in item context and speededness conditions can lead to unacceptably large random error components. These can be avoided by presenting items used to measure change in identical test forms, with identical timings and administration conditions. Thus, we do *not* maintain that the item parameter estimates obtained in any particular booklet configuration are appropriate for other conceivable configurations. Rather, we assume that the parameter estimates are context-bound. This is the reason that the long-term trend booklets and administration procedures have not changed since the early 1980s and only a limited number of blocks of items are released after each main assessment cycle. It was also the reason we prefer common population equating to common item equating whenever equivalent random samples are available for linking. In common item equating, items are assumed to be measuring exactly the same thing for two or more populations, despite any differences in context or administration. In common population equating, results for two or more samples from the same population are matched to one another when linking the scales. Therefore, the data from the State Assessment were calibrated separately from the national NAEP data. In this case, the administration procedures differed somewhat between the State Assessment and the national NAEP.

In practice, PARSCALE item fit statistics are used as a way to identify items that need further examination. Most of the statistics of this type that are available for use in this setting have distributions that are unknown. Therefore, they cannot be used for final decisions about the fit of the items to the IRT model. Because of the lack of statistical tests for IRT model fit, the fit of the IRT models to the observed data was examined within each scale by comparing the empirical item response functions (IRFs) with the theoretical curves. The primary means of accomplishing this is to generate plots of empirical versus theoretical item response curves. The theoretical curves are plots of the response functions based on the estimates of the item parameters. The empirical proportions are calculated from the posterior distributions of the thetas for each student who received the item. For dichotomous items, the sum of the values of the posterior distributions at a point on the theta scale for each student who answered an item correctly plus the sum of a fractional portion of the values of the posterior distribution at that point on the theta scale for each student who omitted the item is parallel in meaning to the number of students who actually answered the item correctly plus a fraction of the number of students who omitted the item. The sum of the values of the posterior distributions for all students receiving the item at each point on the theta scale is parallel in meaning to the empirical number of students at that point on the theta scale who received the item. The plotted values are sums of these individual posteriors at each point on the theta scale for those who got the item correct plus a fraction of the omitters divided by the sum of the posteriors of those administered the item, in the case of dichotomous items, and for those who scored in the category of interest over the sum for those who received the item, in the case of polytomous items.

Figure 11-1 contains a plot of the empirical and theoretical IRFs for a dichotomous item. In the plot, the horizontal axis represents the theta (proficiency) scale, the vertical axis represents the probability of a correct response. The solid curve is the theoretical IRF based on the item parameter estimates and Equation (11.1). The centers of the diamonds represent the empirical proportions correct as described above. The size of the diamonds are proportional to the sum of the posteriors at each point on the theta scale for all of those who received the item; this is related to the number of students contributing to the estimation of that empirical proportion correct.

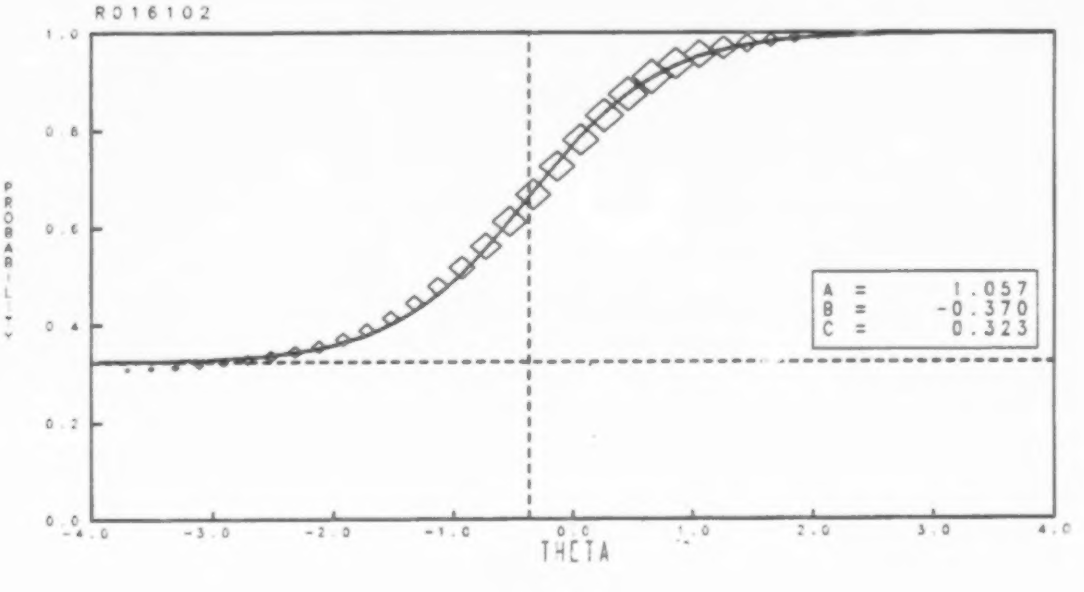
Figure 11-2 contains a plot of the empirical and theoretical IRFs for a polytomous item from the 1997 Arts (Theatre) National Assessment. As for the dichotomous item plot in Figure 11-1, the horizontal axis represents the proficiency scale, but the vertical axis represents the probability of having a response fall in each category. The solid curves are the theoretical IRFs based on the item parameter estimates and Equation (11.3). The centers of the diamonds represent the empirical proportions of students with responses in each category and are proportional to the sum of the posteriors at each point on the theta scale for the students who received the item.

For good fitting items, the empirical and theoretical curves are close together. Therefore, items for which this is not true are examined carefully. Examples of plots for specific items are provided in the subject-area chapters. When the same items are presented in two assessment years, the empirical curves for the two years can be compared. Normally, these curves differ somewhat due to the sampling of students for each of the two years. Figure 12-1 contains a plot for an item with curves of this type. When the empirical curves differ dramatically, one cause might be a change in the meaning of the item due to instructional or societal changes across the years. This type of item is ordinarily treated as two different items—one for each of the assessment years. Figure 12-4 contains the plot for an item that has been treated in this way.

To summarize, using current methodologies in psychometrics, assumption of conditional independence and the assumption that the data fit the models in Equations 11.1 and 11.3 are examined and controlled in NAEP in several ways. They are examined by considering tests of DIF, item fit statistics, and plots of empirical and theoretical IRFs. They are controlled by treating missing and "not reached" responses in reasonable ways, maintaining the context and administration of items across assessments, collapsing categories of polytomous items when appropriate, combining items into a single item, or making decisions about the inclusion or exclusion of an item in a scale based on data. The identification and amelioration of violations of IRT assumptions is an area of ongoing research in educational measurement.

Figure 11-1

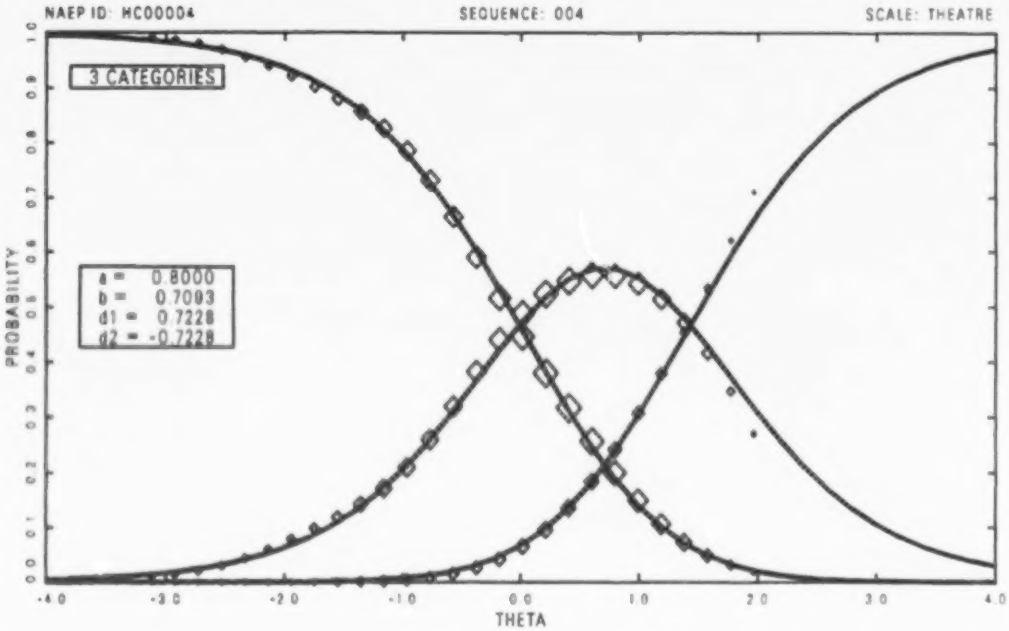
Example Cross-Sectional Dichotomous Item (R016102, Age 13/Grade 8)
*Exhibiting Good Model Fit**



****Note:*** *The plot compares empirical and model-based estimates of the item response function (IRF). The smooth curve represents the model-based estimate at each provisional proficiency level. The diamonds represent the empirical proportion of 1994 age 13/grade 8 students answering correctly at each point on the theta scale.*

Figure 11-2

*Example Polytomous Item (HC00004, Grade 8) Exhibiting Good Model Fit**



****__Note__*: The plot compares empirical and model-based estimates of the item category response functions (ICRFs). The smooth curve represents the model-based estimate at each provisional proficiency level. The diamonds represent the empirical proportion of 1997 grade 8 students with responses in each category at each point on the theta scale.*

11.3.2 An Overview of Plausible Values Methodology

Item response theory was developed in the context of measuring individual examinees' abilities. In that setting, each individual is administered enough items (often 60 or more) to permit precise estimation of his or her θ, as a maximum likelihood estimate, $\hat{\theta}$, for example. Because the uncertainty associated with each θ is negligible, the distribution of θ, or the joint distribution of θ with other variables, can then be approximated using an individual's $\hat{\theta}$ values as if they were θ values.

This approach breaks down in the assessment setting when, in order to provide broader content coverage in limited testing time, each respondent is administered relatively few items in a subject area scale. A first problem is that the uncertainty associated with individual θs is too large to ignore, and the features of the $\hat{\theta}$ distribution can be seriously biased as estimates of the θ distribution. (The failure of this approach was verified in early analyses of the 1984 NAEP reading survey; see Wingersky, Kaplan, & Beaton, 1987.) A second problem, occurring even with test lengths of 60, arises when test forms vary across and within assessments as to the numbers, formats, and content of the test items. The measurement error distributions thus differ even if underlying θ distributions do not, causing $\hat{\theta}$ distributions to exhibit spurious changes and comparisons in apparent population distributions—easily greater than actual differences over time or across groups. Although this latter problem is avoided in traditional standardized testing by presenting students with parallel test forms, controlled tightly across time and groups, the same constraints cannot be imposed in the design and data-collection phases of the present NAEP. Plausible values were developed as a way to estimate key population features consistently, and approximate others no worse than standard IRT procedures would, even when item booklet composition, format, and content balances change over time. A detailed development of plausible values methodology is given in Mislevy (1991). Along with theoretical justifications, that paper presents comparisons with standard procedures, discussions of biases that arise in some secondary analyses, and numerical examples.

The following provides a brief overview of the plausible values approach, focusing on its implementation in the 1996 NAEP analyses.

Let $\underline{y}$ represent the responses of all sampled examinees to background and attitude questions, along with variables based on the sampling design such as the school where the student is enrolled, and let $\underline{\theta}$ represent the vector of proficiency values. If $\underline{\theta}$ were known for all sampled examinees, it would be possible to compute a statistic $t(\underline{\theta},\underline{y})$, such as a scale or composite subpopulation sample mean, a sample percentile point, or a sample regression coefficient, to estimate a corresponding population quantity T. A function $U(\underline{\theta},\underline{y})$—e.g., a jackknife estimate—would be used to gauge sampling uncertainty, as the variance of t around T in repeated samples from the population.

Because the scaling models are latent variable models, however, $\underline{\theta}$ values are not observed even for sampled students. To overcome this problem, we follow Rubin (1987) by considering $\underline{\theta}$ as "missing data," and approximate $t(\underline{\theta},\underline{y})$ by its expectation given $(\underline{x},\underline{y})$, the data that actually were observed, as follows:

$$\begin{aligned} t^*(\underline{x},\underline{y}) &= \mathbf{E}\left[t(\underline{\theta},\underline{y})\middle|\underline{x},\underline{y}\right] \\ &= \int t(\underline{\theta},\underline{y})\,p(\underline{\theta}|\underline{x},\underline{y})\,d\underline{\theta}. \end{aligned} \tag{11.6}$$

It is possible to approximate t^* using random draws from the predictive conditional distribution of the scale proficiencies given the item responses x_i, background variables y_i, and model parameters for sampled student i. These values are referred to as imputations in the sampling literature, and plausible values in NAEP. The value of $\underline{\theta}$ for any respondent that would enter into the computation of t is thus replaced by a randomly selected value from the respondent's conditional distribution. Rubin (1987) proposes that this process be carried out several times—multiple imputations—so that the uncertainty associated with imputation can be quantified. The average of the results of, for example, M estimates of t, each computed from a different set of plausible values, is a Monte Carlo approximation of (11.6); the variance among them, B, reflects uncertainty due to not observing $\underline{\theta}$, and must be added to the estimated expectation of $U(\underline{\theta},\underline{y})$, which reflects uncertainty due to testing only a sample of students from the population. Section 11.5 explains how plausible values are used in subsequent analyses.

It cannot be emphasized too strongly that **plausible values are *not* test scores for *individuals*** in the usual sense. Plausible values are offered only as intermediary computations for calculating integrals of the form of Equation (11.6), in order to estimate *population* characteristics. When the underlying model is correctly specified, plausible values will provide consistent estimates of population characteristics, even though they are not generally unbiased estimates of the proficiencies of the individuals with whom they are associated. The key idea lies in the contrast between plausible values and the more familiar estimates of proficiency (e.g., maximum likelihood estimate or Bayes estimate) that are in some sense optimal for each examinee: *Point estimates that are optimal for individual examinees have distributions that can produce decidedly nonoptimal (specifically, inconsistent) estimates of population characteristics* (Little & Rubin, 1983). Plausible values, on the other hand, are constructed explicitly to provide consistent estimates of population effects. For further discussion see Mislevy, Beaton, Kaplan, and Sheehan (1992).

11.3.3 Computing Plausible Values in IRT-Based Scales

Plausible values for each respondent r are drawn from the predictive conditional distribution $p(\underline{\theta}_r|\underline{x}_r,\underline{y}_r,\Gamma,\Sigma)$, where Γ and Σ are regression model parameters defined in this subsection. This subsection describes how, in IRT-based scales, these conditional distributions are characterized, and how the draws are taken. An application of Bayes' theorem with the IRT assumption of conditional independence produces

$$p(\underline{\theta}_r|\underline{x}_r,\underline{y}_r,\Gamma,\Sigma) \propto P(\underline{x}_r|\underline{\theta}_r,\underline{y}_r,\Gamma,\Sigma)\,p(\underline{\theta}_r|\underline{y}_r,\Gamma,\Sigma) = P(\underline{x}_r|\underline{\theta}_r)\,p(\underline{\theta}_r|\underline{y}_r,\Gamma,\Sigma) \tag{11.7}$$

where, for vector-valued $\underline{\theta}_r$, $P(\underline{x}_r|\underline{\theta}_r)$ is the product over scales of the *independent likelihoods* induced by responses to items within each scale, and $p(\underline{\theta}_r|\underline{y}_r,\Gamma,\Sigma)$ is the multivariate—and generally nonindependent—*joint density* of proficiencies for the scales, conditional on the observed value y_r of background responses, and the parameters Γ and Σ. The provisional scales are determined by the item parameter estimates that constrain the population mean to zero and standard deviation to one. The item parameter estimates are fixed and regarded as population values in the computation described in this subsection.

In the analyses of the data from the main assessments, a normal (Gaussian) form was assumed for $p(\underline{\theta}_r|\underline{y}_r,\Gamma,\Sigma)$, with a common variance-covariance matrix, Σ, and with a mean given by a linear model with slope parameters, Γ, based on the first approximately 200 principal components of several hundred selected main-effects and two-way interactions of the complete vector of background variables. The included principal components will be referred to as the *conditioning variables*, and will be denoted $\underline{y}^c$. (The complete set of original background variables used in the analyses of each subject area are listed in Appendix C.) The following model was fit to the data within each subject area:

$$\underline{\theta} = \Gamma'\underline{y}^c + \underline{\varepsilon} \tag{11.8}$$

where $\underline{\varepsilon}$ is multivariately normally distributed with mean zero and variance-covariance matrix Σ. The number of principal components of the background variables used for each sample was sufficient to account for 90 percent of the total variance of the full set of background variables (after standardizing each variable). As in regression analysis, Γ is a matrix each of whose columns is the *effects* for one scale and Σ is the matrix *variance-covariance of residuals* between scales.

A model similar to (11.8) was used for the long-term trend assessments, with the difference that $\underline{y}^c$ consisted of main effects and interactions from the smaller set of background variables (rather than principal components of those variables) available in the long-term trend assessments.

Maximum likelihood estimates of Γ and Σ, denoted by $\hat{\Gamma}$ and $\hat{\Sigma}$, are obtained with extensions of Sheehan's (1985) MGROUP computer program using the EM algorithm described in Mislevy (1985). The EM algorithm requires the computation of the mean, $\overline{\underline{\theta}}_r$, and variance-covariance matrix, Σ_r^p, of the predictive conditional distribution in (11.7) for respondent *r* when there are *p* scales within a subject area. For subject areas with multiple scales, the CGROUP version of the MGROUP program was used to compute the moments using higher order asymptotic corrections to a normal approximation (Thomas, 1993). For the long-term trend assessments, each of which have a single scale, the more precise but computationally intensive BGROUP version of MGROUP was used. BGROUP uses numeric quadrature to evaluate the predictive conditional distribution moments required by the E-step of the EM algorithm for one- and two-dimensional applications (Thomas, 1993). For estimation of group means on a single scale, CGROUP and BGROUP results will be nearly identical to those from the original MGROUP program. CGROUP and BGROUP yield better estimates of correlations between scales, and hence better estimates of composite scale means. BGROUP will, theoretically, yield better estimates than CGROUP, but because of the heavy computational demands of the methodology used, its function is limited to bivariate scales. Hence CGROUP is used for assessments involving more than two scales.

After completion of the EM algorithm, the plausible values for all sampled respondents is drawn in the following three-step process. First, a value of Γ is drawn from a normal distribution with mean being $\hat{\Gamma}$ and variance being the variance of $\hat{\Gamma}$. Second, conditional on the generated value of Γ and the fixed value of $\Sigma = \hat{\Sigma}$, the predictive conditional distribution mean $\overline{\underline{\theta}}_r$ and the predictive conditional distribution variance Σ_r of respondent *r* are computed from Equation 11.7 using the EM algorithm (see Thomas, 1993). Finally, the $\underline{\theta}_r$ are drawn independently from a multivariate normal distribution with mean $\overline{\underline{\theta}}_r$ and variance Σ_r approximating the distribution in (11.7). These three steps are repeated five times producing five sets of imputation values for all sampled respondents.

11.4 INFERENCES ABOUT PROFICIENCIES

When survey variables are observed without error from every respondent, usual variance estimators quantify the uncertainty associated with sample statistics from the only source of uncertainty, namely the sampling of respondents. Item-level statistics for NAEP cognitive items meet this requirement, but proficiency values do not. The IRT models used in their construction posit an unobservable proficiency variable $\underline{\theta}$ to summarize performance on the items in the subarea. The fact that θ values are not observed even for the respondents in the sample requires additional statistical analyses to draw inferences about $\underline{\theta}$ distributions and to quantify the uncertainty associated with those inferences. As described above, Rubin's (1987) multiple imputations procedures were adapted to the context of latent variable models to produce the plausible values upon which many analyses of the data from the 1996 assessment were based. This section describes how plausible values were employed in subsequent analyses to yield inferences about population and subpopulation distributions of proficiencies.

11.4.1 Computational Procedures

Even though one does not observe the $\underline{\theta}$ value of respondent *r*, one does observe variables that are related to it: $\underline{x}_r$, the respondent's answers to the cognitive items he or she was administered in the area of interest, and $\underline{y}_r$, the respondent's answers to demographic and background variables. Suppose one wishes to draw inferences about a number $T(\underline{\theta}, \underline{Y})$ that could be calculated explicitly if the $\underline{\theta}$ and $\underline{y}$ values of each member of the population were known. Suppose further that if $\underline{\theta}$ values were observable, we would be able to estimate T from a sample of N pairs of $\underline{\theta}$ and $\underline{y}$ values by the statistic $t(\underline{\theta},\underline{y})$ [where $(\underline{\theta},\underline{y}) \equiv (\theta_1,y_1,\ldots,\theta_N,y_N)$], and that we could estimate the variance in t around T due to sampling respondents by the function $U(\underline{\theta},\underline{y})$. Given that observations consist of $(\underline{x}_r,\underline{y}_r)$ rather than $(\underline{\theta}_r,\underline{y}_r)$, we can approximate t by its expected value conditional on $(\underline{x},\underline{y})$, or

$$t^*(\underline{x},\underline{y}) = E[t(\underline{\theta},\underline{y})|\underline{x},\underline{y}] = \int t(\underline{\theta},\underline{y})\, p(\underline{\theta}\,|\underline{x},\underline{y})\, d\underline{\theta}\ .$$

It is possible to approximate t^* with random draws from the conditional distributions $p(\underline{\theta}_i|x_i,y_i)$, which are obtained for all respondents by the method described in Section 11.3.3. Let $\hat{\underline{\theta}}_m$ be the mth such vector of plausible values, consisting of a multidimensional value for the latent variable of each respondent. This vector is a plausible representation of what the true $\underline{\theta}$ vector might have been, had we been able to observe it.

The following steps describe how an estimate of a scalar statistic $t(\underline{\theta},\underline{y})$ and its sampling variance can be obtained from M (>1) such sets of plausible values. (Five sets of plausible values are used in NAEP analyses.)

1. Using each set of plausible values $\hat{\underline{\theta}}_m$ in turn, evaluate t as if the plausible values were true values of $\underline{\theta}$. Denote the results $\hat{t}_m$, for $m=1,\ldots,M$.

2. Using the jackknife variance estimator defined in Chapter 10, compute the estimated sampling variance of $\hat{t}_m$, denoting the result U_m.

3. The final estimate of t is

$$t^* = \sum_{m=1}^{M} \frac{\hat{t}_m}{M}\ .$$

4. Compute the average sampling variance over the M sets of plausible values, to approximate uncertainty due to sampling respondents

$$U^* = \sum_{m=1}^{M} \frac{U_m}{M}\ .$$

5. Compute the variance among the M estimates $\hat{t}_m$, to approximate the between-imputation variance

$$B = \sum_{m=1}^{M} \frac{\left(\hat{t}_m - t^*\right)^2}{(M-1)}\ .$$

6. The final estimate of the variance of t^* is the sum of two components

$$V = U^* + (1 + M^{-1})B.$$

In this equation, $(1+M^{-1})B$ is the estimate of variance due to the latency of $\underline{\theta}$. Due to the excessive computation that would be required, NAEP analyses did not compute and average jackknife variances over all five sets of plausible values, but only on the first set. Thus, in NAEP reports, U^* is approximated by U_1.

11.4.2 Statistical Tests

The variance described in Section 11.4.1 is used to make statistical tests comparing NAEP results. This section describes the relationships between these tests and the variance components described above. Chapter 18 contains details of the hypothesis tests used in this assessment.

Suppose that if $\underline{\theta}$ values were observed for sampled students, the statistic $(t - T)/U^{1/2}$ would follow a t-distribution with d degrees of freedom. Then the incomplete-data statistic $(t^* - T)/V^{1/2}$ is approximately t-distributed, with degrees of freedom (Satterthwaite, 1941; Johnson & Rust, 1993) given by

$$v = \frac{1}{\dfrac{f^2}{M-1} + \dfrac{(1-f)^2}{d}}$$

where f is the proportion of total variance due to not observing $\underline{\theta}$ values:

$$f = (1 + M^{-1})B / V.$$

When B is small relative to U^*, the reference distribution for incomplete-data statistics differs little from the reference distribution for the corresponding complete-data statistics. This is the case with main NAEP reporting variables. If, in addition, d is large, the normal approximation can be used to flag "significant" results.

For k-dimensional $\underline{t}$, such as the k coefficients in a multiple regression analysis, each U_m and U^* is a covariance matrix, and B is an average of squares and cross-products rather than simply an average of squares. In this case, the quantity $(T-\underline{t}^*)\, V^{-1}\, (T-\underline{t}^*)$, is approximately F distributed, with degrees of freedom equal to k and v, with v defined as above but with a matrix generalization of f:

$$f = (1+M^{-1})\, Trace\, (BV^{-1})/k\,.$$

By the same reasoning as used for the normal approximation for scalar t, a chi-square distribution on k degrees of freedom often suffices for multivariate $\underline{t}$.

11.4.3 Biases in Secondary Analyses

Statistics t^* that involve proficiencies in a scaled content area and variables included in the conditioning variables $\underline{y}^c$ are consistent estimates of the corresponding population values T. This includes interrelationships among scales within a content area that have been treated in the multivariate manner described above in Section 11.3.3. Statistics involving background variables y that were *not* conditioned on, or relationships among proficiencies from *different* content strands or fields, are subject to asymptotic biases whose magnitudes depend on the type of statistic and the strength of the relationships of the nonconditioned background variables to the variables that were conditioned on and to the proficiency of interest. That is, the large sample expectations of certain sample statistics need not equal the true population parameters.

The *direction* of the bias is typically to underestimate the effect of nonconditioned variables. For details and derivations see Beaton and Johnson (1990), Mislevy (1991), and Mislevy and Sheehan (1987, Section 10.3.5). For a given statistic t^* involving one content area and one or more nonconditioned background variables, the *magnitude* of the bias is related to the extent to which observed responses $\underline{x}$ account for the latent variable θ, and the degree to which the nonconditioned background variables are explained by conditioning background variables. The first factor—conceptually related to test reliability—acts consistently in that greater measurement precision reduces biases in *all* secondary analyses. The second factor acts to reduce biases in certain analyses but increase it in others. In particular,

- High shared variance between conditioned and nonconditioned background variables *mitigates* biases in analyses that involve only proficiency and nonconditioned variables, such as marginal means or regressions.

- High shared variance *exacerbates* biases in regression coefficients of conditional effects for nonconditioned variables, when nonconditioned and conditioned background variables are analyzed jointly as in multiple regression.

The large number of background variables that have been included in the conditioning vectors for the 1996 assessments allows a large number of secondary analyses to be carried out with little or no bias, and mitigates biases in analyses of the marginal distributions of θ in nonconditioned variables. Kaplan and Nelson's analysis of the 1988 NAEP reading data (some results of which are summarized in Mislevy, 1991), which had a similar design and fewer conditioning variables, indicates that the potential bias for nonconditioned variables in multiple regression analyses is below 10 percent, and biases in simple regression of such variables is below five percent. Additional research (summarized in Mislevy, 1990) indicates that most of the bias reduction obtainable from conditioning on a large number of variables can be captured by instead conditioning on the first several principal components of the matrix of all original conditioning variables. This procedure was adopted for the 1992, 1994, and 1996 main assessments by replacing the conditioning effects by the first *K* principal components, where *K* was selected so that 90 percent of the total variance of the full set of conditioning variables (after standardization) was captured. Mislevy (1990) shows that this puts an upper bound of 10 percent on the average bias for all analyses involving the original conditioning variables.

11.4.4 A Numerical Example

To illustrate how plausible values are used in subsequent analyses, this subsection gives some of the steps in the calculation of the 1992 grade 4 reading composite mean and its estimation-error variance. This illustration is an example of the calculation of NAEP means and variances and can be used to understand their calculation for any NAEP assessment.

The weighted mean of the first plausible values of the reading composite for the grade 4 students in the sample is 217.79, and the jackknife variance of these values is 0.833. Were these values true θ values, then 217.79 would be the estimate of the mean and 0.833 would be the estimation-error variance. The weighted mean of the second plausible values of the same students, however, is 217.62; the third, fourth, and fifth plausible values give weighted means of 217.74, 218.24, and 218.05. Since all of these figures are based on precisely the same sample of students, the variation among them is due to uncertainty about the students' θs, having observed their item responses and background variables. Consequently, our best estimate of the mean for grade 4 students is the average of the five plausible values: 217.89. Taking the jackknife variance estimate from the first plausible value, 0.833, as our estimate U^* of sampling variance, and the variance among the five weighted means, .063, as our estimate B of uncertainty due to not observing θ, we obtain as the final estimate V of total error variance $0.833 + (1+5^{-1})\ .063 = 0.908$.

It is also possible to partition the estimation error variance of a statistic using these same variance components. The proportion of error variance due to sampling students from the population is U^*/V, and the proportion due to the latent nature of θ is $(1+M^{-1})B/V$. The results are shown in Table 11-1. The value of U^*/V roughly corresponds to reliability in classical test theory and indicates the amount of information about an average individual's θ present in the observed responses of the individual. It should be recalled again that the objective of NAEP is not to estimate and compare values of individual examinees, the accuracy of which is gauged by reliability coefficients. The objective of NAEP, rather, is to estimate population and subpopulation characteristics, and the marginal estimation methods described above have been designed to do so consistently regardless of the values of reliability coefficients.

Table 11-1
Estimation Error Variance and Related Coefficients for the 1992 Grade 4 Reading Composite (Based on Five Plausible Values)

			Proportion of Variance Due to...	
U^*	$(1+5^{-1})B$	V	**Student Sampling: U^*/V**	**Latency of θ: $(1+5^{-1})B/V$**
0.833	0.076	0.908	0.92	0.08

Chapters 12 through 17 and Appendix E provide values of the proportion of variance due to sampling and due to the latent nature of θ for all 1996 scales and composites for the populations as a whole and, in the appendix, for selected subpopulations. It will be seen that the proportion of variance due to the latency of θ varies somewhat among subject areas, tending to be largest for the long-term trend writing assessment, where there is low correlation between tasks and each student responded to only one or at most two tasks. The proportion of variance due to latency of θ is smallest for the composites of the main assessment subjects, where the number of items per student is largest. Essentially, the variance due to the latent nature of θ is largest when there is less information about a student's proficiency. (Note the distinction between estimation error variance of a parameter estimate and the estimate of the variance of the θ distribution. The former depends on the accuracy of measurement; the large-sample model-based expected value of the latter does not.) Given fixed assessment time, this decrease in information will occur whenever the amount of information per unit time decreases as can happen when many short constructed-response or multiple-choice items are replaced by a few extended constructed-response items.

11.5 DESCRIBING STUDENT PERFORMANCE

Since its beginning, a goal of NAEP has been to inform the public about what students in American schools know and can do. While the NAEP scales provide information about the distributions of proficiency for the various subpopulations, they do not directly provide information about the meaning of various points on the scale. Traditionally, meaning has been attached to educational scales by norm-referencing—that is, by comparing students at a particular scale level to other students. In contrast, NAEP achievement levels and scale anchors describe selected points on the scale in terms of the types of skills that are likely to be exhibited by students scoring at that level. The achievement level process was applied to the science composite. Scale anchoring of certain percentiles of the student proficiency distribution was applied to the long-term trend assessment composite using the 1996 data. The achievement level process for mathematics was completed for the 1990 assessment when the NAEP mathematics framework was revised, so the results were directly applied to the 1996 results. In addition, each item was mapped to a point on the scale in which it belonged, so that the content of each item provides information about what students at each score level can do in a probabistic sense.

11.5.1 Achievement Levels

NAGB has determined that achievement levels shall be the first and primary way of reporting NAEP results. Setting achievement levels is a method for setting standards on the NAEP assessment that identify what students *should* know and be able to do at various points on the composite. For each grade of each subject, three levels were defined—basic, proficient, and advanced. Based on initial policy definitions of these levels, panelists were asked to determine operational descriptions of the levels appropriate with the content and skills assessed in the assessment. With these descriptions in mind, the panelists were then asked to rate the assessment items in terms of the expected performance of marginally acceptable examinees at each of these three levels. These ratings were then mapped onto the NAEP scale to obtain the achievement level cutpoints for reporting. Further details of the achievement level-setting process for science appear in Appendix G.

11.5.2 Performance Descriptions Based on Composite Scales

A procedure known as scale anchoring was used to develop descriptions of student performance at selected points on the composite scales. The scale points that were selected for anchoring reflect three levels of knowledge and abilities corresponding to lower-, middle-, and higher-performing students for each subject.

Around each percentile point, a band was built to define a range of scale scores. Students described as being at a particular level were within a five percentile point range on either side of the specified scale point. For example, the 50th percentile was defined as the region between the 45th and 55th percentile points on the scale. A question was identified as anchoring at a percentile point on the scale if it was answered successfully by at least 65 percent of the students within that percentile band. (The criterion was set at 74 percent for multiple-choice questions to correct for the possibility of answering correctly by guessing.)

After defining the bands of the scale to be anchored, the next step in the process was to identify: (1) questions answered correctly for dichotomously scored questions, or (2) questions answered at a particular score level for partial credit constructed-response questions. Because the extended constructed-response questions were scored according to four levels of performance, each extended constructed-response question was treated as three distinct questions corresponding to scores of Partial or better, Essential or better, and Extensive. These distinct score levels were then analyzed in the same manner as questions scored dichotomously, as either correct or incorrect. Thus, for example, an extended constructed-response question might anchor at the 50th percentile for Partial or better responses **and** at the 90th percentile for Essential or better responses.

A committee of subject area experts, including teachers for the grades involved, college professors, state curriculum supervisors, and researchers, was assembled to review the sets of questions identified for each percentile band. The committee was divided into three groups, one for each grade. Each group examined and analyzed questions that anchored at the 25th, 50th, and 90th percentiles to determine the specific knowledge and abilities associated with each question.

Committee members were also provided with the sets of questions at each grade that "did not anchor" to inform their decisions about what students could do by seeing examples of what they could not do. Drawing on their knowledge of the subject area, committee members were asked to summarize student performance by describing the knowledge, skills, and abilities demonstrated by students in each of the score bands.

The performance descriptions are cumulative; that is, the abilities described for the lower performing students are considered to be among the abilities of students performing at higher points on the scale. Therefore, the full description of student's knowledge and abilities in the middle scale band would include those abilities described at the lower band. Similarly, the abilities of students performing at the higher scale band include the abilities described for students at the middle and lower bands.

11.5.3 Item Mapping Procedures

In order to map items (questions) to particular points on each subject area scale, a response probability convention had to be adopted that would divide those who had a higher probability of success from those who had a lower probability. Establishing a response probability convention has an impact on the mapping of assessment items onto the scales. A lower boundary convention maps the items at lower points along the scales, and a higher boundary convention maps the same items at higher points along the scales. The underlying distribution of skills in the population does not change, but the choice of a response probability convention does have an impact on the proportion of the student population that is reported as "able to do" the items on the scales.

There is no obvious choice of a point along the probability scale that is clearly superior to any other point. If the convention were set with a boundary at 50 percent, those above the boundary would be more likely to get an item right than get it wrong, while those below that boundary would be more likely to get the item wrong than right. While this convention has some intuitive appeal, it was rejected on the grounds that having a 50/50 chance of getting the item right shows an insufficient degree of mastery. If the convention were set with a boundary at 80 percent, students above the criterion would have a high probability of success with an item. However, many of the students below this criterion show some level of achievement that would be ignored by such a stringent criterion. In particular, those in the range between 50 and 80 percent correct would be more likely to get the item right than wrong, yet would not be in the group described as "able to do" the item.

In a compromise between the 50 percent and the 80 percent conventions, NAEP has adopted two related response probability conventions: 74 percent for multiple-choice items (to correct for the possibility of answering correctly by guessing), and 65 percent for constructed-response items (where guessing is not a factor). These probability conventions were established, in part, based on an intuitive judgment that they would provide the best picture of students' knowledge and skills.

Some additional support for the dual conventions adopted by NAEP was provided by Huynh (1998, 1994). He examined the IRT information provided by items, according to the IRT model used in scaling NAEP items. Following Bock (1972), Huynh decomposed the item information into that provided by a correct response [$P_{ji}(\theta) * I_j(\theta)$] and that provided by an incorrect response [$(1-P(\theta)) * I(\theta)$]. Huynh showed that the item information provided by a correct response to a constructed-response item is maximized at the point along the scale at which two-thirds of the students get the item correct (for multiple-choice items with four options, information is maximized at the point at which 75 percent get the item correct). Maximizing the item information, $I(\theta)$, rather than the information provided by a correct response $[P(\theta) * I(\theta)]$, would imply an item mapping criterion closer to 50 percent. Maximizing the item information, $I(\theta)$, takes into account both responses that are correct and those that are incorrect, however.

For dichotomously scored items the information function as defined by Birnbaum (1968, p. 463) is defined for the *j*th item as

$$I_j(\theta) = \frac{(1.7a_j)^2 P_{j0}(\theta_k)[P_{j1}(\theta_k) - c_j]^2}{P_{j1}(\theta_k)(1 - c_j)^2},$$

where the notation is the same as that used in Equations (11.1) and (11.2). The item information function was defined by Samejima (1969) in general for polytomously scored items, and has been derived for items scaled by the generalized partial credit model (Muraki, 1993; Donoghue, 1994) as (in a slightly different, but equivalent form)

$$I_j(\theta) = (1.7a_j)^2 \left[\sum_{i=0}^{m_j-1} i^2 P_{ji}(\theta_k) - \left\{ \sum_{i=0}^{m_j-1} i P_{ji}(\theta_k) \right\}^2 \right].$$

11.6 OVERVIEW OF THE 1996 NAEP SCALES

The following IRT scale-score analyses were carried out for the 1996 NAEP assessment:

- *Mathematics:* Five IRT scales linked back to the 1990 and 1992 main assessment of mathematics and one unidimensional IRT mathematics scale linking 1996 results to results from mathematics assessments in 1973, 1976, 1982, 1986, 1990, 1992, and 1994. The first five scales, along with a composite scale, are associated with the 1996 main assessment, while the unidimensional scale is associated with the 1996 long-term trend assessment.

- *Science:* Three newly developed IRT scales for the main assessment of science and one unidimensional scale linking 1996 results to results from science assessments in 1969, 1973, 1977, 1982, 1986, 1990, 1992, and 1994. The first three scales, along with a composite scale, are associated with the 1996 main assessment, while the unidimensional scale is associated with the 1996 long-term trend assessment.

- *Long-Term Trend Reading:* One IRT scale linking 1996 results to results from reading assessments in 1971, 1975, 1979, 1984, 1988, 1990, 1992, and 1994. This scale is associated with the 1996 long-term trend assessment.

- *Long-Term Trend Writing:* One polytomous item scale linking 1996 writing results to the 1984, 1988, 1990, 1992, and 1994 assessments. This scale is associated with the 1996 long-term trend assessment.

Details follow in Chapters 12 through 17.

Chapter 12

DATA ANALYSIS FOR THE MATHEMATICS ASSESSMENT[1]

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12.1 INTRODUCTION

This chapter describes the analyses performed on the responses to the cognitive and background items in the 1996 mathematics assessment. This chapter focuses on the methods and procedures used to estimate IRT-based scale score distributions for subgroups of students. This includes a wide array of topics, such as the scoring of constructed-response items, classical item characteristics, item responsetheory (IRT) analysis of mathematics scales, and estimation of subgroup means by the imputation of plausible values. The statistical bases of the IRT and plausible values methodology described in this chapter are given in Chapter 11. These analyses led to the results presented in *NAEP 1996 Mathematics Report Card for the Nation and the States* (Reese, Miller, Mazzeo, & Dossey, 1997). For a description of the state analyses, see the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* (Allen, Jenkins, Kulick, & Zelenak, 1997).

The student samples that were administered mathematics items in the 1996 national assessment are shown in Table 12-1. (See Chapters 1 and 3 for descriptions of the target populations and the sample design used for the assessment.). These samples were defined only by grade (4, 8, or 12) and not by age of the student. Data from the Math Main samples comprised the spiraled balanced incomplete block (BIB) design. The present chapter contains information about the scaling of data from these samples. The long-term trend analyses are presented in a separate chapter (see Chapter 15). The other samples (Math-Estimation, Math-Theme, and Math-Advanced) will be analyzed and presented in separate focus reports. A brief description of the analyses of these samples is presented in Section 12.3. Technical documentation detailing the analyses of the 1996 State Assessment of mathematics is provided in the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* (Allen, Jenkins, Kulick, & Zelenak, 1997).

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[1] Frank Jenkins was the primary person responsible for the planning, specifications, and coordination of the national mathematics analyses. He was assisted by Hua-Hua Chang. Data analysis and scaling were coordinated by Ed Kulick with help from Steve Wang and Xiaohui Wang and additional assistance from David Freund.

Table 12-1

NAEP 1996 Mathematics Student Samples

Sample	Booklet Number	Mode	Cohort Assessed	Time of Testing[1]	Number Assessed
4 [Math Main]	1-26	Print	Grade 4	1/3/96 - 3/29/96 (Winter)	6,627
8 [Math Main]	1-26	Print	Grade 8	1/3/96 - 3/29/96 (Winter)	7,146
12 [Math Main]	1-26	Print	Grade 12	1/3/96 - 3/29/96 (Winter)	6,904
4 [Math-Estimation]	127	Tape	Grade 4	1/3/96 - 3/29/96 (Winter)	2,023
8 [Math-Estimation]	127	Tape	Grade 8	1/3/96 - 3/29/96 (Winter)	2,183
12 [Math-Estimation]	127	Tape	Grade 12	1/3/96 - 3/29/96 (Winter)	1,849
4 [Math-Theme]	128,129	Print	Grade 4	1/3/96 - 3/29/96 (Winter)	3,790
8 [Math-Theme]	128,129	Print	Grade 8	1/3/96 - 3/29/96 (Winter)	4,027
12 [Math-Theme]	128,129	Print	Grade 12	1/3/96 - 3/29/96 (Winter)	3,735
8 [Math-Advanced]	130	Print	Grade 8	1/3/96 - 3/29/96 (Winter)	2,337
12 [Math-Advanced]	130	Print	Grade 12	1/3/96 - 3/29/96 (Winter)	2,965

[1] Final makeup sessions were held April 1-5, 1996.

LEGEND:

Math	Mathematics	Print	Printed administration
Main	Main spiral BIB assessment	Tape	Audiotape administration
Estimation	Main estimation assessment	Theme	Assessment with theme booklets
Advanced	Assessment with advanced booklets		

12.2 DESCRIPTION OF STUDENT SAMPLE, ITEMS, AND ASSESSMENT BOOKLETS

The data from the main BIB mathematics assessment (from samples 4[Math Main], 8 [Math Main], and 12[Math Main]) were used for main analyses comparing the levels of mathematics achievement for various subgroups of the 1996 target populations. In previous assessments the mathematics samples were defined as age/grade cohorts (e.g., students who were either in the fourth grade or 9 years old). Starting with the 1996 assessment, cohorts were defined solely by grade. The sampled students in each of these three grade cohorts were assessed in the winter. The samples in the main assessment are presented in Table 12-1.

The pool of items used in the 1996 mathematics assessment contained a range of constructed-response and multiple-choice questions measuring performance on sets of objectives (National Assessment Governing Board, 1994). The framework for the objectives is described in Chapter 2. A total of 360 distinct mathematics items addressing these objectives were scaled (see Table 12-2). The number of items per grade was 144, 164, and 165 respectively for grades 4, 8, and 12 (before scaling). Tables 12-3, 12-5, and 12-7 give, for each grade, the numbers of items by item type and block (before scaling). For item counts after scaling, taking into account items that were dropped or collapsed, see Tables 12-4, 12-6, and 12-8. These tables indicate that there was a nearly fourfold increase in the number of polytomously-scored constructed-response items over the numbers presented in the 1992 assessment. In 1996, the number of items was 30 in grade 4, 30 in grade 8, and 33 in grade 12. The items were classified into five content strands: *numbers and operations*; *measurement*; *geometry*; *data analysis, statistics, and probability*; and *algebra and functions*. These five content strands (renamed *number sense, properties, and operations*; *measurement*; *geometry and spatial sense*; *data analysis, statistics, and probability*; and *algebra and functions* in the 1996 analysis) constituted the scales used in 1996 reporting.[2] The items were partitioned into 13 blocks and these blocks were then assigned to 26 booklets according to a BIB design. Each booklet contained relatively few items from each of the five categories.

Table 12-2

National Main BIB: Numbers of Scaled Mathematics Items Common Across Grade Levels, by Content Strand Scale

Grade(s)	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions	Total
4 only	40	20	12	11	8	91
8 only	20	13	12	10	18	73
12 only	23	11	17	22	32	105
4 and 8	10	2	9	3	7	31
8 and 12	8	9	6	9	6	38
4 and 12	0	0	0	0	0	0
4, 8, and 12	9	3	4	3	3	22
Total Grade 4	59	25	25	17	18	144
Total Grade 8	47	27	31	25	34	164
Total Grade 12	40	23	27	34	41	165
Total	110	58	60	58	74	360

In the main samples, each student was administered a booklet containing three blocks of mathematics cognitive items, a block of background questions common to all booklets for a particular grade level, and a block of mathematics-related background questions common to all mathematics booklets for a particular grade level. At the end of each booklet there was a short block consisting of five questions concerning the student's motivation and his or her perception of the difficulty of the cognitive items. The BIB design by which the 13 blocks of mathematics cognitive items were assigned to the 26 booklets for each grade level is discussed in Chapter 4. The 13 blocks were not intended to be parallel measuring instruments. For example, several blocks contained only the items designed for calculator usage, and some blocks contained items for ruler and protractor usage. In addition, the proportion of items sampled from the five categories were not exactly the same among the 13 blocks.

The 360 unique items were constructed according to several formats, some traditional and some more innovative: multiple-choice items, constructed-response items scored dichotomously, constructed-response items scored polytomously, and cluster items.[3] The multiple-choice items conformed to the familiar format of a stem followed by several possible answers, with only one answer being correct.

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[2] The content strand *number sense, properties, and operations* was called *numbers and operations* in the 1990 and 1992 assessments. The content strand *geometry and spatial sense* was called *geometry* in the 1990 and 1992 assessments.

[3] A cluster item is an aggregation of a group of items (in the case of NAEP mathematics, typically three to five items) that are related to a single content strand, topic, or stimulus, and are developed and scored as a single unit (see Wainer & Kiely, 1987, for further details and examples of different types of cluster items).

Constructed-response items that were scored dichotomously were questions that required an open-ended response (e.g., explaining why the previous question was answered as it was). These questions were read by raters who determined whether or not the response was correct. Constructed-response items that were scored polytomously were open-ended questions that required several stages of reasoning or problem solving. They were also read by raters but were given a score reflecting degree of correctness rather than simply judged right or wrong. Cluster items were derived from a set of three to five multiple-choice items that related to the same basic stem. The cluster score was the number of constituent cluster items that the respondent answered correctly.

As Table 12-3 indicates, of the 144 items at grade 4, 79 were multiple-choice items, 16 were constructed response items that were scored dichotomously, 48 were constructed-response items that were scored polytomously, and 1 was a cluster item. As shown in Table 12-5, of 163 items at grade 8, 91 were multiple-choice items, 21 were constructed-response items that were scored dichotomously, 48 were constructed-response items that were scored polytomously, and 3 were cluster items. For grade 12, Table 12-7 indicates that of the 166 items administered, 92 were multiple-choice items, 21 were constructed-response items that were scored dichotomously, 50 were constructed-response items that were scored polytomously, and 3 were cluster items.

Tables 12-4, 12-6, and 12-8 show comparable information for each grade after the scaling was carried out.

Table 12-3

1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade 4, As Defined Before Scaling

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	**Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Items**	**Items**
M3	9	4	0	0	0	0	13
M4	14	0	0	0	0	0	14
M5	4	0	5	0	1	0	10
M6	0	7	2	2	0	0	11
M7	3	0	4	0	1	0	8
M8	14	0	1	0	0	0	15
M9	6	2	0	0	1	1	10
M10	0	1	4	1	0	0	6
M11	11	0	0	2	3	0	16
M12	5	0	3	0	1	0	9
M13	6	1	2	2	1	0	12
M14	4	0	5	0	1	0	10
M15	3	1	5	0	1	0	10
Total	**79**	**16**	**31**	**7**	**10**	**1**	**144**

Table 12-4

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade 4, As Defined After Scaling**

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	**Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Items**	**Items**
M3	9	4	0	0	0	0	13
M4	14	0	0	0	0	0	14
M5	4	0	5	0	1	0	10
M6	0	7	2	2	0	0	11
M7	3	2	2	0	1	0	8
M8	14	0	1	0	0	0	15
M9	6	2	0	1	0	1	10
M10	0	1	4	1	0	0	6
M11	11	0	0	2	3	0	16
M12	5	0	3	0	1	0	9
M13	6	1	2	2	1	0	12
M14	4	0	5	1	0	0	10
M15	3	2	4	0	1	0	10
Total	**79**	**19**	**28**	**9**	**8**	**1**	**144**

* Counts reflect items that were dropped and collapsed.

Table 12-5

1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade, As Defined Before Scaling

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	**Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Items**	**Items**
M3	8	2	0	1	1	1	13
M4	21	0	0	0	0	0	21
M5	6	0	4	0	1	0	11
M6	0	11	4	1	0	0	16
M7	4	0	5	0	1	0	10
M8	16	1	0	1	0	0	18
M9	5	3	0	0	1	0	9
M10	0	1	5	1	0	0	7
M11	13	0	1	2	3	0	19
M12	4	0	4	1	0	0	9
M13	6	3	1	0	1	0	11
M14	5	0	3	0	1	1	10
M15	3	0	4	0	1	1	9
Total	**91**	**21**	**31**	**7**	**10**	**3**	**163**

Table 12-6

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade 8, As Defined After Scaling**

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	**Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Items**	**Items**
M3	8	2	0	2	0	1	13
M4	21	0	0	0	0	0	21
M5	6	1	4	0	0	0	11
M6	0	11	4	1	0	0	16
M7	4	1	5	0	0	0	10
M8	16	1	0	1	0	0	18
M9	5	3	0	1	0	0	9
M10	0	1	5	1	0	0	7
M11	13	0	1	2	3	0	19
M12	4	2	3	0	0	0	9
M13	6	3	1	1	0	0	11
M14	5	1	1	1	0	1	9
M15	3	0	4	1	0	1	9
Total	**91**	**26**	**28**	**11**	**3**	**3**	**162**

* Counts reflect items that were dropped and collapsed.

Table 12-7

1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade 12, As Defined Before Scaling

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	**Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Items**	**Items**
M3	10	3	1	0	0	0	14
M4	22	0	0	0	0	0	22
M5	4	0	5	0	1	0	10
M6	0	13	2	2	0	0	17
M7	3	0	4	0	1	1	9
M8	17	2	1	1	0	0	21
M9	6	2	0	1	0	0	9
M10	3	0	5	1	1	0	10
M11	11	1	2	0	0	0	14
M12	4	0	4	0	1	1	10
M13	3	0	0	3	3	0	9
M14	5	0	4	0	1	1	11
M15	4	0	5	0	1	0	10
Total	**92**	**21**	**33**	**8**	**9**	**3**	**166**

Table 12-8

*1996 NAEP Mathematics Block Composition by Content Strand and Item Type, Grade 12, As Defined After Scaling**

	Multiple-Choice	Constructed-Response Items Scored Polytomously				Cluster	Total
Block	Items	2-category	3-category	4-category	5-category	Items	Items
M3	10	3	1	0	0	0	14
M4	22	0	0	0	0	0	22
M5	4	0	6	0	0	0	10
M6	0	13	2	2	0	0	17
M7	3	0	4	1	0	1	9
M8	17	2	1	1	0	0	21
M9	6	2	0	1	0	0	9
M10	3	0	5	2	0	0	10
M11	11	1	2	0	0	0	14
M12	4	0	4	1	0	1	10
M13	3	0	0	4	2	0	9
M14	4	1	3	1	0	1	10
M15	4	1	5	0	0	0	10
Total	**91**	**23**	**33**	**13**	**2**	**3**	**165**

* Counts reflect items that were dropped and collapsed.

12.3 SPECIAL MATHEMATICS ASSESSMENTS

There were three special studies in the 1996 NAEP assessment—*estimation*, *theme*, and *advance*d studies. The block structure of the special study booklets is provided only in Table 12-9. The estimation and the two theme blocks have a linking BIB block, M4, in the first position. This structure held for all three grades, but the actual items in the blocks varied over grades. In addition to the cognitive blocks, each of the special study booklets included three blocks in common with the main assessment:

- a general student background block (BM1),
- a mathematics background block (MB1), and
- a motivation block (M2).

Table 12-9

Block Structure of the Special Study Booklets

Study	Booklet	Cognitive Blocks
Estimation	127	M4, M16, M17
Theme	128	M4, M21
Theme	129	M4, M22
Advanced Mathematics[1]	130	M20, M18, M19

[1] Grades 8 and 12 only

The cognitive portion of the estimation booklet was administered in two sections: first there was a regular mathematics block in common with the main assessment that was self-paced; and second, there were two estimation blocks (M16 and M17) in which items were administered by a paced audio tape. The theme and advanced booklets were self-paced. Note that the theme booklets contained a single non-theme block (M4) in common with the main assessment.

The special studies were not part of the main assessment; analysis for these booklets will appear in separate focus reports. The major findings for these studies will be derived from an analysis of the 'reporting' samples, which are subsamples of the assessment's total sample. The nonreporting segments of the total samples were added to the assessments in order to study the effects of changing inclusion rules and accommodations for students of limited English proficiency (LEP) and students with disabilities (SD) (See Section 12.4).

The estimation and theme samples were drawn from the same population as the main assessment. The grades 8 and 12 advanced booklets were drawn from a population of students considered to be high mathematics achievers. Students for the grade 8 study of advanced mathematics were sampled from a population of students who were enrolled in an advanced class (defined as algebra 1 or beyond) during the 1995-96 school year. For grade 12, the advanced study students were also sampled from a population of students who took an advanced course during the school year. Grade 12 advanced courses were; Algebra 3, Pre-calculus, Calculus and Analytical Geometry, Calculus, and AP Calculus. Table 12-10 lists the number of items in the special assessment blocks in the three grades. More detail is available in the procedural appendices of reports on the estimation, theme and advanced analyses.

Table 12-10

Number of Cognitive Items in the
1996 Special Mathematics Assessment Blocks

	Estimation Blocks		Theme Blocks		Advanced Blocks		
	M16	**M17**	**M21**	**M22**	**M20**	**M18**	**M19**
Grade 4	20	14	8	6	—[1]	—[1]	—[1]
Grade 8	22	16	12	15	13	10	12
Grade 12	22	16	11	7	15	11	11

[1] There were no advanced blocks administered to grade 4 students.

12.4 ASSESSING THE EFFECT OF CHANGING INCLUSION CRITERION AND ACCOMMODATIONS FOR SD/LEP STUDENTS

NAEP samples include SD/LEP students in at least the same percentages in which they are found in the general school population. Although a substantial percentage of these students are included in the assessment, schools are allowed to exclude some of these students from NAEP when the students are judged to be incapable of meaningfully participating in a large scale assessment. To facilitate the consistent implementation of NAEP's intention to include as many students as possible, NAEP provides specific criteria that staff in sampled schools can use to determine who should be included in the assessment.

In the 1996 assessment, procedures for dealing with SD and LEP students were modified, based on recommendations from the U.S. Department of Education. First, inclusion criteria were revised with the intention of making them clearer, more inclusive, and more likely to be applied consistently across schools. Second, a variety of assessment accommodations and adaptations were offered to

- students with disabilities whose individualized education programs (IEPs) specified such accommodations, and
- LEP students who were unable to take the assessment in English.

In order to assess the impact of new inclusion criteria and accommodations, a three-sample design was instituted at all three grades. The first sample comprised students who were subject to the 1994 inclusion rules and, as was the case in past NAEP assessments, were offered no accommodations. Students in the second sample were subject to the 1996 inclusion rules but the SD/LEP students were offered no accommodations. The third sample had students who were comprised students who were assessed under conditions that will probably be used for future NAEP assessments—new inclusion rules and some accommodations being offered to the included SD/LEP students. See Chapter 3, Sections 3.4 to 3.8, for more details.

Results of this study can be found in the focus report dealing with the comparison of the three accommodation samples.

12.5 ITEM ANALYSIS

This section contains a detailed description of the item analysis performed using the national main BIB sample data. The analysis examines items within blocks. In preparation for this analysis, constructed-response items with more than two categories and cluster items were polytomously scored, two-category constructed-response items were dichotomously scored, and derived background variables were calculated. Item statistics such as mean percent correct, average score, item to total score correlations and percent responding in each item category were calculated.

Tables 12-11, 12-12, and 12-13 show the number of items, mean proportion correct, mean item to total score correlation, and alpha reliability for each block administered at each grade level for the main assessment. These values were calculated within block only for those items used in the scaling process. The table also gives the number of students who were administered the block and the percent not reaching the last item in the block. Student weights were used, except for reporting the sample sizes. The results for the blocks administered at each grade level indicated that the blocks differ in number of items, average difficulty, reliability, and percent not reaching the last item.

Tables 12-11 through 12-13 show the item analyses by block position within a booklet. Each booklet had three cognitive blocks, and each block appeared in three different booklets—once in the first, once in the second, and once in the third position. In some past assessments (e.g., 1992 science), students responded differently to the items depending on the block position. The IA tables evidence few systematic differences in item summary statistics as a function of block position. For grade 4 (Table 12-11) the weighted average item score had a slight tendency to be higher when a block was in the first rather than the third position. For grades 8 and 12 no systematic difference can be seen.

Table 12-11

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Mathematics Main Sample, Grade 4, As Defined After Scaling

Statistic	Block Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Number of scale items														
Total		13	14	10	11	8	15	13	6	16	9	12	10	10
Multiple choice		9	14	4	0	3	14	9	0	11	5	6	4	3
Constructed response (dichotomous)		4	0	0	11	2	1	2	6	5	0	5	0	2
Constructed response (polytomous)		0	0	6	0	3	0	2	0	0	4	1	6	5
Unweighted sample size	1	502	498	516	511	509	501	525	497	519	506	494	507	529
	2	515	515	501	494	519	509	510	516	518	503	520	499	499
	3	522	497	516	509	493	499	511	497	495	517	525	516	511
	ALL	1539	1510	1533	1514	1521	1509	1546	1510	1532	1526	1539	1522	1539
Weighted average item score	1	.51	.46	.45	.45	.38	.58	.48	.43	.50	.47	.53	.45	.45
	2	.49	.45	.47	.43	.38	.59	.46	.41	.51	.49	.53	.46	.45
	3	.49	.44	.44	.42	.38	.61	.46	.40	.49	.46	.55	.45	.42
	ALL	.50	.45	.46	.44	.38	.59	.47	.41	.50	.47	.54	.45	.44
Weighted alpha reliability	1	.67	.63	.75	.69	.70	.71	.67	.61	.75	.71	.67	.68	.75
	2	.70	.66	.74	.71	.72	.74	.68	.63	.74	.71	.68	.69	.75
	3	.72	.61	.75	.72	.63	.75	.64	.66	.77	.72	.71	.70	.77
	ALL	.69	.63	.75	.71	.69	.74	.66	.63	.75	.71	.69	.69	.76
Weighted average r-polyserial	1	.59	.52	.68	.65	.70	.55	.64	.81	.59	.67	.64	.67	.67
	2	.61	.55	.68	.67	.73	.58	.65	.81	.59	.66	.63	.67	.66
	3	.63	.53	.67	.68	.64	.58	.61	.83	.60	.68	.68	.66	.69
	ALL	.61	.53	.68	.66	.69	.57	.63	.82	.59	.67	.65	.67	.67
Weighted proportion of students Reaching the last item	1	.81	.91	.88	.81	.81	.79	.98	.85	.84	.81	.93	.62	.87
	2	.79	.91	.89	.87	.87	.80	.96	.91	.90	.85	.96	.73	.89
	3	.81	.91	.89	.79	.82	.82	.99	.90	.90	.87	.95	.73	.94
	ALL	.81	.91	.89	.82	.83	.81	.98	.89	.88	.85	.95	.69	.90

Table 12-12

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Mathematics Main Sample, Grade 8, As Defined After Scaling

Statistic	Block Position	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Number of scale items														
Total		17	21	12	16	10	18	9	7	19	9	11	14	12
Multiple choice		12	21	7	0	4	16	5	0	13	4	6	10	6
Constructed response (dichotomous)		3	0	1	16	1	2	3	7	6	2	4	1	0
Constructed response (polytomous)		2	0	4	0	5	0	1	0	0	3	1	3	6
Unweighted sample size	1	558	556	543	571	555	541	546	543	538	547	543	550	539
	2	535	558	548	556	561	566	542	534	551	530	544	546	551
	3	544	538	554	542	554	540	548	568	569	542	549	543	528
	ALL	1637	1652	1645	1669	1670	1647	1636	1645	1658	1619	1636	1639	1618
Weighted average item score	1	.51	.58	.55	.59	.56	.50	.36	.56	.63	.34	.51	.41	.46
	2	.50	.60	.54	.61	.56	.53	.35	.55	.65	.33	.51	.42	.45
	3	.51	.58	.53	.62	.54	.50	.37	.55	.64	.34	.51	.41	.44
	ALL	.51	.59	.54	.61	.55	.51	.36	.55	.64	.34	.51	.41	.45
Weighted alpha reliability	1	.75	.76	.72	.82	.68	.79	.56	.65	.76	.60	.67	.58	.76
	2	.75	.74	.70	.85	.66	.80	.63	.54	.79	.66	.68	.63	.72
	3	.74	.78	.69	.82	.71	.76	.64	.58	.80	.68	.65	.64	.70
	ALL	.75	.76	.70	.83	.68	.79	.61	.59	.79	.64	.67	.61	.72
Weighted average r-polyserial	1	.66	.55	.63	.67	.66	.63	.58	.82	.62	.65	.62	.55	.70
	2	.66	.53	.61	.73	.63	.63	.64	.76	.64	.68	.63	.56	.67
	3	.66	.56	.61	.67	.70	.60	.64	.78	.65	.68	.62	.56	.65
	ALL	.66	.55	.62	.69	.66	.62	.62	.79	.64	.67	.62	.56	.67
Weighted proportion of students Reaching the last item	1	.98	.87	.97	.90	.78	.72	.96	.90	.90	.81	.98	.76	.83
	2	.93	.86	.96	.93	.76	.71	.94	.89	.87	.82	.96	.76	.85
	3	.95	.88	.94	.92	.84	.75	.96	.92	.93	.85	.98	.80	.88
	ALL	.95	.87	.96	.91	.79	.72	.95	.90	.90	.83	.97	.77	.85

Table 12-13

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Mathematics Main Sample, Grade 12, As Defined After Scaling

		Block												
Statistics	**Block Position**	**M3**	**M4**	**M5**	**M6**	**M7**	**M8**	**M9**	**M10**	**M11**	**M12**	**M13**	**M14**	**M15**
Number of scaled items														
Total		14	22	10	17	9	21	9	10	14	10	9	14	10
Multiple choice		10	22	4	0	3	17	6	3	11	4	3	8	4
Constructed response (dichotomous)		4	0	0	17	0	4	2	6	3	0	5	1	1
Constructed response (polytomous)		0	0	6	0	6	0	1	1	0	6	1	5	5
Unweighted sample size	1	525	530	519	536	539	548	530	526	523	540	532	526	516
	2	515	519	539	523	525	529	545	547	524	516	536	544	518
	3	530	534	522	520	511	535	527	540	523	525	535	535	532
	ALL	1570	1583	1580	1579	1576	1612	1602	1613	1570	1590	1603	1605	1566
Weighted average item score	1	.43	.70	.36	.55	.45	.55	.52	.47	.48	.41	.44	.47	.31
	2	.43	.70	.37	.56	.43	.55	.49	.45	.51	.42	.41	.48	.31
	3	.45	.70	.39	.56	.44	.56	.48	.43	.49	.41	.42	.48	.33
	ALL	.44	.70	.37	.56	.41	.55	.49	.45	.49	.40	.42	.48	.31
Weighted alpha reliability	1	.74	.76	.73	.83	.75	.80	.63	.52	.72	.70	.64	.76	.70
	2	.69	.77	.71	.81	.74	.82	.59	.58	.69	.70	.66	.76	.70
	3	.76	.75	.72	.81	.77	.80	.58	.62	.72	.68	.68	.80	.70
	ALL	.73	.76	.72	.82	.77	.81	.60	.58	.71	.76	.66	.78	.70
Weighted average r-polyserial	1	.69	.61	.72	.71	.70	.63	.65	.57	.63	.63	.67	.70	.72
	2	.64	.61	.70	.68	.70	.63	.63	.61	.61	.60	.69	.69	.71
	3	.70	.59	.70	.66	.73	.63	.60	.63	.63	.60	.70	.74	.69
	ALL	.68	.60	.71	.69	.74	.63	.63	.61	.63	.63	.69	.71	.71
Weighted proportion of students Reaching the last item	1	.65	.84	.70	.78	.86	.48	.96	.88	.68	.78	.91	.78	.82
	2	.67	.81	.70	.74	.86	.45	.94	.88	.70	.77	.90	.78	.81
	3	.69	.78	.76	.65	.84	.50	.92	.87	.67	.83	.90	.77	.82
	ALL	.67	.81	.72	.72	.85	.48	.94	.88	.68	.79	.90	.78	.82

As described in Chapter 9, in NAEP analyses (both conventional and IRT-based), a distinction is made between missing responses at the end of each block (not-reached) and missing responses prior to the last completed response (omitted). Not-reached items are those occurring after the last item the student completed in a block. Items that were not reached are treated as if they had not been presented to the examinee, while omitted items are regarded as incorrect. The proportion of students attempting the last item of a block (or, equivalently, 1 minus the proportion not reaching the last item) is often used as an index of the degree of speededness of the block of items.

Standard practice at ETS is to treat all students who did not respond to the last item as if they had not reached that item. For multiple-choice and short constructed-response items, this convention produced a reasonable pattern of results, in that the proportion of students reaching the last item does not differ markedly from the proportion attempting the next-to-last item. However, for the blocks that ended with extended constructed-response items, this convention resulted in an implausibly large drop in the number of students attempting the final item (see Koretz et al., 1993). Therefore, for blocks that ended with an extended constructed-response item, students who attempted the next-to-last item but did not respond to the last item were classified as having intentionally omitted that item.

Tables 12-11 to 12-13 also contain information about the effect of the position of blocks within booklets on the average percent correct for items within each block presented to the BIB samples for each grade. The averages for the grade-only portion of the focused-BIB samples show that the order of blocks within booklets did not have a large or consistent effect on scale scores in the mathematics focused-BIB assessment.

12.5.1 Constructed-Response Items

As indicated in Tables 12-3 to 12-8, over 40 percent of the mathematics items were constructed-response. Constructed-response items that were scored dichotomously were given a right/wrong scoring. The categories of responses for the items and the number of responses that were rescored for each item are indicated in Appendix I. The percent agreement for the raters and Cohen's Kappa, a reliability estimate appropriate for items that are dichotomized, are also given in the tables. The sample sizes listed in the tables correspond to the samples used in calculating the rater reliability.

In general, the rater reliability of the scoring for dichotomized responses was quite high. Cohen's Kappa reliabilities ranged over items from 0.76 to 1.00 for grade 4, from 0.90 to 1.00 for grade 8, and from 0.67 to 1.00 for grade 12.

Chapter 7 discusses the definition of the item ratings and describes the process by which teams of raters scored the constructed-response items. This discussion includes the rating definitions for short and extended constructed-response items as well as the range of interrater reliabilities that occurred. Extended constructed-response items were scored on a scale from 1 to 5 to reflect degrees of knowledge. In scaling, this scale is shifted to 0 to 4. Rating information on extended constructed-response items can be found in Appendix I, which lists the sample sizes, percent agreement, and Cohen's Kappa reliability index.

12.5.2 Differential Item Function Analysis

A differential item functioning (DIF) analysis of the main-assessment mathematics items was done in order to guide committees in identifying biased items that should be examined more closely for possible bias. Sample sizes were large enough to compare male and female students, White and Black students, and White and Hispanic students.

The DIF analyses of the dichotomous items were based on the Mantel-Haenszel chi-square procedure, as adapted by Holland and Thayer (1988), which is described in Chapter 9. The procedure tests the statistical hypothesis that the odds of correctly answering an item are the same for two groups of examinees that have been matched on some measure of mathematics ability (usually referred to as the matching criterion). The DIF analyses of the polytomous items were based on the Mantel procedure (1963) and the Somes (1986) chi-square test (see also Chapter 9). These procedures compare proportions of matched examinees from each group in each polytomous item response category. The groups being compared are often referred to as the focal group (usually a minority or other group of interest, such as Black examinees or female examinees) and the reference group (usually White examinees or male examinees).

For each dichotomous item in the assessment, an estimate was produced of the Mantel-Haenszel common-odds ratio, expressed on the ETS delta scale for item difficulty. The estimates indicate the difference between reference group and focal group item difficulties (measured in ETS delta scale units), and typically run between about +3 and -3. Positive values indicate items that are differentially easier for the focal group than the reference group after making an adjustment for the overall level of mathematics ability in the two groups. Similarly, negative values indicate items that are differentially harder for the focal group than the reference group. It is common practice at ETS to categorize each item into one of three categories (Peterson, 1988): "A" (items exhibiting no DIF), "B" (items exhibiting a weak indication of DIF), or "C" (items exhibiting a strong indication of DIF). Items in category "A" have Mantel-Haenszel common-odds ratios on the delta scale that do not differ significantly from 0 at the alpha = 0.05 level or are less than 1.0 in absolute value. Category "C" items are those with Mantel-Haenszel values that are significantly greater than 1 and larger than 1.5 in absolute magnitude. Other items are categorized as B items. A plus sign (+) indicates that items are differentially easier for the focal group; a minus sign (-) indicates that items are differentially more difficult for the focal group.

The ETS/NAEP DIF procedure for polytomous items incorporates both the MH ordinal procedure and the generalized MH statistic. The summary tables of identified polytomous items contain generalizations of the dichotomous "A," "B," and "C" categories namely "AA," "BB," and "CC" respectively. Analogous to the dichotomous case, only the "CC" items are considered to have a strong indication of DIF and are flagged for scrutiny by the subject matter committee

For each block of items at each grade four DIF comparisons were made: male/female, White/Asian American, White/Black, and White/Hispanic. The first subgroup in each comparison is the reference group; the second subgroup is the focal group.

Following standard practice at ETS for DIF analyses conducted on final test forms, all "C" and "CC" items were reviewed by a committee of trained test developers and subject-matter specialists. As indicated by Tables 12-14 and 12-15, two dichotomous items and five polytomous items met the criteria to be considered by the DIF committee. Such committees are charged with making judgments about whether or not the differential difficulty of an item is *unfairly* related to group membership. See Appendix J for a list of the "C" and "CC" items.

The committee assembled to review NAEP items included both ETS staff and outside members with expertise in the field. It was the committee's judgment that none of the "C" or "CC" items for the national data were functioning differentially due to factors irrelevant to test objectives. In other words, all of the items that were classified as "C" or "CC" items measured concepts in the assessment framework and specifications that could not be measured in another way. Hence, none of the items were removed from scaling due to differential item functioning.

Table 12-14

DIF Category by Grade for Dichotomous Items

Grade	DIF Category[1]	Analysis		
		Male/Female	**White/Black**	**White/Hispanic**
4	C-	0	0	0
	B-	1	2	0
	A-	11	9	10
	A+	7	5	9
	B+	1	4	1
	C+	0	0	0
8	C-	0	0	0
	B-	2	0	0
	A-	13	7	13
	A+	9	15	8
	B+	0	2	3
	C+	0	0	0
12	C-	0	0	0
	B-	3	1	0
	A-	14	8	11
	A+	5	12	10
	B+	0	0	0
	C+	0	1	1

[1] Positive values of the index indicate items that are differentially easier for the focal group (female, Black, or Hispanic students) than for the reference groups (male or White students). "A+" or "A-" means no indication of DIF. "B+" means a weak indication of DIF in favor of the focal group. "B-" means a weak indication of DIF in favor of the reference group and "C+" or "C-" means a strong indication of DIF.

Table 12-15

DIF Category by Grade for Polytomous Items

Grade	DIF Category[1]	Male/Female	Analysis White/Black	White/Hispanic
4	CC-	0	0	0
	BB-	1	1	0
	AA-	13	14	12
	AA+	10	11	15
	BB+	3	1	0
	CC+	0	0	0
8	CC-	0	3	1
	BB-	0	2	2
	AA-	10	14	13
	AA+	16	7	10
	BB+	1	1	1
	CC+	0	0	0
12	CC-	0	0	0
	BB-	2	3	1
	AA-	9	14	15
	AA+	18	10	12
	BB+	1	2	2
	CC+	0	1	0

[1] Positive values of the index indicate items that are differentially easier for the focal group (female, Black, or Hispanic students) than for the reference groups (male or White students). "A+" or "A-" means no indication of DIF, "B+" means a weak indication of DIF in favor of the focal group, "B-" means a weak indication of DIF in favor of the reference group and "C+" or "C-" means a strong indication of DIF.

12.5.3 Estimation of Item Parameters

The BILOG/PARSCALE computer program was used to estimate the item parameters for the main assessment and for the special estimation study. For dichotomous multiple-choice and dichotomized constructed-response items, a three-parameter IRT model was used. Extended constructed-response and cluster items were polytomously scored and were analyzed with a generalized partial credit model (Muraki, 1992).

Recall from section 12.5 that for calibration, items that were missing prior to the last completed item in a block were considered omitted and scored as wrong. Also, items that were not reached were treated as if they were not presented to the examinees (and not counted as wrong.) However, there is an exception for blocks that end with an extended constructed-response item. In these blocks, students who respond to the next-to-last item but do not respond to the last item are classified as having omitted the last item (i.e., the last item is counted as wrong). Responses to extended constructed-response items that were off-task were also treated as omitted. The multi-category constructed-response items had two, three, four or five categories of partial credit. Scoring levels were labeled as listed in Table 12-16.

Table 12-16

Labels for Score Levels of Polytomous Items

Score	3-Category Item	4-Category Item	5-Category Item
4			Correct
3		Correct	4th Category
2	Correct	3rd Category	3rd Category
1	2nd Category	2nd Category	2nd Category
0	Incorrect, off-task, or omitted	Incorrect, off-task, or omitted	Incorrect, off-task, or omitted

Note that the categories falling between "incorrect" and "correct" represent increasing levels of a partially correct response.

The item parameter estimation was done separately within grade, but ~~the~~ final mathematics scale estimates were transformed to conform with the cross-grade scales of the 1990 and 1992 assessments. Within each grade, items were scaled using the grade-only sample of students available from the 1992 and the 1996 assessments. The 1992 data were included at the scaling step of the analysis to assure that parameter estimates for items administered at both time points would not drift drastically between assessments. Item parameters were estimated separately for each of the five content strands and the mathematics scale means and variances for samples from the two assessment years were allowed to be different. In the final BILOG/PARSCALE run, the prior distributions of the population abilities were free to be estimated and the overall distribution was centered at zero. In general, if an item was common to both assessment years, identical item parameters were used for both assessments. The appropriateness of the use of the identical parameters across assessments was examined by comparing the fit of the empirical item response functions against the estimated IRT item response functions. If IRT parameters did not fit the data, parameters specific to the assessment year were used. (See Chapter 11 for further descriptions of the scaling process.) The calibration was based on student weights that were rescaled so that the their sum equaled the unweighted sample size of the 1996 sample. Also, weights for the 1992 data were restandardized to give equal weight to the two assessment years included in the scaling (see Appendix K).

Items that received special treatment in the scaling procedure are listed in Table 12-17, along with the reason for special treatment. Items were dropped, combined into clusters, split between assessment years and collapsed. If items had empirical item response functions that were nonmonotonic, they were dropped. If several items had highly correlated responses (conditional on theta) they were combined into a single polytomous item called a cluster item. If items were administered in both 1992 and 1996 but showed evidence of having a distinct item response functions for each assessment year, the item is treated as two separate items and parameters estimated separately for each assessment year. If polytomous items had sparse or nonmonotonic responses in one or more categories, the items were collapsed so that some response categories were combined into a single category. Only about ten percent of the total scaled items were given special treatment.

Table 12-17

Items from the 1996 Assessment in Mathematics Receiving Special Treatment

Grade	NAEP ID	Block	Content Strand	Treatment
4	M010531	M8	1	1992 and 1996 responses split into items M010531Y and M010531Z
4	M040801	M9	2	1992 and 1996 responses split into items M040801Y and M040801Z
4	M041001	M9	2	1992 and 1996 responses split into items M041001Y and M041001Z
4	M041201	M9	3	1992 and 1996 responses split into items M041201Y and M041201Z Categories in both items collapsed: 0,1,2,3,4 becomes 0,1,2,3,3,
4	M068001	M7	1	Collapsed categories: 0,1,2 becomes 0,0,1
4	M068003	M7	3	Collapsed categories: 0,1,2 becomes 0,0,1
4	M072701	M14	5	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
4	M074701	M15	1	Collapsed categories: 0,1,2 becomes 0,0,1
8	M013531	M8	1	1992 and 1996 responses split into items M013531Y and M013531Z
8	M018201	M4	1	1992 and 1996 responses split into items M018201Y and M018201Z
8	M018901	M4	4	1992 and 1996 responses split into items M018901Y and M018901Z
8	M045901	1992	3	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3 1992 only
8	M050261	M3	4	Collapsed categories: 0,1,2,3,4 becomes 0,0,0,1,2
8	M051001	M3	3	1992 and 1996 responses split into items M051001Y and M051001Z
8	M051101	M3	1	1992 and 1996 responses split into items M051101Y and M051101Z Categories in both items collapsed: 0,1,2,3,4 becomes 0,1,2,3,3
8	M051201	M13	1	1992 and 1996 responses split into items M051201Y and M051201Z
8	M052201	M13	2	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
8	M053101	M9	4	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,2,3
8	M054301	1992	5	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3 1992 only

Table 12-17 (continued)

Items from the 1996 Assessment in Mathematics Receiving Special Treatment

Grade	NAEP ID	Block	Content Strand	Treatment
8	M055501	1992	1	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3 1992 only
8	M066301	M5	5	Collapsed categories: 0,1,2 becomes 0,1,1
8	M067501	M5	4	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,2,2
8	M068201	M7	3	Collapsed categories: 0,1,2,3,4 becomes 0,0,1,1,1
8	M069301	M12	5	Collapsed categories: 0,1,2 becomes 0,1,1
8	M069601	M12	1	Collapsed categories: 0,1,2 becomes 0,1,1
8	M070001	M12	4	Collapsed categories: 0,1,2,3 becomes 0,1,2,2
8	M0732CL	M14	4	Collapsed categories: 0,1,2,3,4 becomes 0,0,1,2,3
8	M073401	M14	1	Dropped due to bad item fit
8	M073501	M14	4	Collapsed categories: 0,1,2 becomes 0,1,1
8	M073601	M14	1	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
8	M0757CL	M15	5	Collapsed categories: 0,1,2,3 becomes 0,0,1,2
8	M076001	M15	2	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
12	M073402	M14	1	Dropped
12	M025301	M5	1	Dropped 1992 only
12	M024901	M5	2	Dropped 1992 only
12	M070501, M070502	M12	4	Combined into cluster item M0705CL
12	M071701, M071702	M7	5	Combined into cluster item M0717CL
12	M071401	M5	1	Collapsed: 0,1,2,3,4 becomes 0,1,1,1,2
12	M056601	M3	1	1992 and 1996 responses split into items M056601Y and M056601Z
12	M062401	M10	3	1992 and 1996 responses split into items M062401Y and M062401Z Both items collapsed: 0,1,2,3,4 becomes 0,1,2,3,3
12	M073901	M14	3	Collapsed categories: 0,1,2 becomes 0,1,1
12	M012731	M8	3	1992 and 1996 responses split into items M012731Y and M012731Z
12	M058701	M11	3	1992 and 1996 responses split into items M058701Y and M058791Z
12	M071801	M7	4	Collapsed categories: 0,1,2,3,4 becomes 0,1,1,2,3

Table 12-17 (continued)

Items from the 1996 Assessment in Mathematics Receiving Special Treatment

Grade	NAEP ID	Block	Content Strand	Treatment
12	M070601	M12	4	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
12	M0732CL	M14	4	Collapsed categories: 0,1,2,3,4 becomes 0,0,1,2,3
12	M018901	M4	4	1992 and 1996 responses split into items M018901Y and M018901Z
12	M021501	M6	4	1992 and 1996 responses split into items M021501Y and M021501Z
12	M013131	M8	4	1992 and 1996 responses split into items M013131Y and M013131Z
12	M053401	M9	4	1992 and 1996 responses split into items M053401Y and M053401Z
12	M061905	M10	4	1992 and 1996 responses split into items M061905Y and M061905Z
12	M060701	M13	5	1992 and 1996 responses split into items M060701Y and M060701Z Both items collapsed: 0,1,2,3,4 becomes 0,1,2,3,3
12	M074101	M14	5	Collapsed categories: 0,1,2,3,4 becomes 0,1,2,3,3
12	M077001	M15	5	Collapsed categories: 0,1,2,3,4 becomes 0,1,1,1,1
12	M021601	M6	5	1992 and 1996 responses split into items M021601Y and M021601Z
12	M021602	M6	5	1992 and 1996 responses split into items M021602Y and M021602Z

12.5.4 Evaluating the Fit of the IRT Model

During the course of estimating an IRT model, individual items were evaluated to determine how well the item response model fit the data. This was done by visual inspection of plots comparing empirically based and theoretical item response functions. Specifically, for dichotomous items these plots consisted of nonmodel-based estimates of the expected proportion correct for each level of mathematics ability compared to the proportion correct for each level of mathematics ability as predicted by the theoretical item response function. For polytomous extended constructed-response items, similar plots were produced for each item category response function (see Chapter 9 for a fuller explanation of these plots).

In making decisions about excluding items from the final scales, a balance was sought between being too stringent, hence deleting too many items and possibly damaging the content representativeness of the pool of scaled items, and being too lenient, hence including items with model fit poor enough to endanger the types of model-based inferences made from NAEP results. Items that clearly did not fit the model were not included in the final scales; however, a certain degree of misfit was tolerated for a number of items included in the final scales.

For most items, the model fit well. In a few cases, poor fit with the data led to special treatment or deletion of the item. Figures 12-1, 12-4, 12-5 and 12-6 give item response plots of dichotomous items. In the plots, the x-axis depicts scale score, and the y-axis the probability of a correct response. The solid line is the logistic model prediction, and the symbols (usually a circle or diamond) are the nonmodel-based predicted proportions. The size of the symbols are proportional to the estimated number of students at a particular scale score level. The symbols are ordinarily larger in the middle of the theta scale, where most students' scale scores fall. The item parameter values are also included in the plot.

Item response plots for polytomously scored items are given in Figures 12-2, 12-3, 12-7, and 12-8. These are similar to the plots for dichotomous items except that there are several solid lines, one for each item category, with each line indicating the probability of responding in the respective item category. As before, the circles or diamonds indicate the empirical response function, with the size of the circles and diamonds proportional to the estimated number of students at a scale score level.

In the plots good fit of the model to the data is indicated when the model-based functions (solid lines) coincide with the empirical functions (circles, diamonds, or other symbols).When the empirical plot is far away from the model based line, there is poor fit of the model to the data.

Four examples of fit are illustrated. First there is good model fit which is shown by Figure 12-1 for a dichotomous item and Figure 12-2 for a polytomous item. In both cases empirical and theoretical lines coincide.

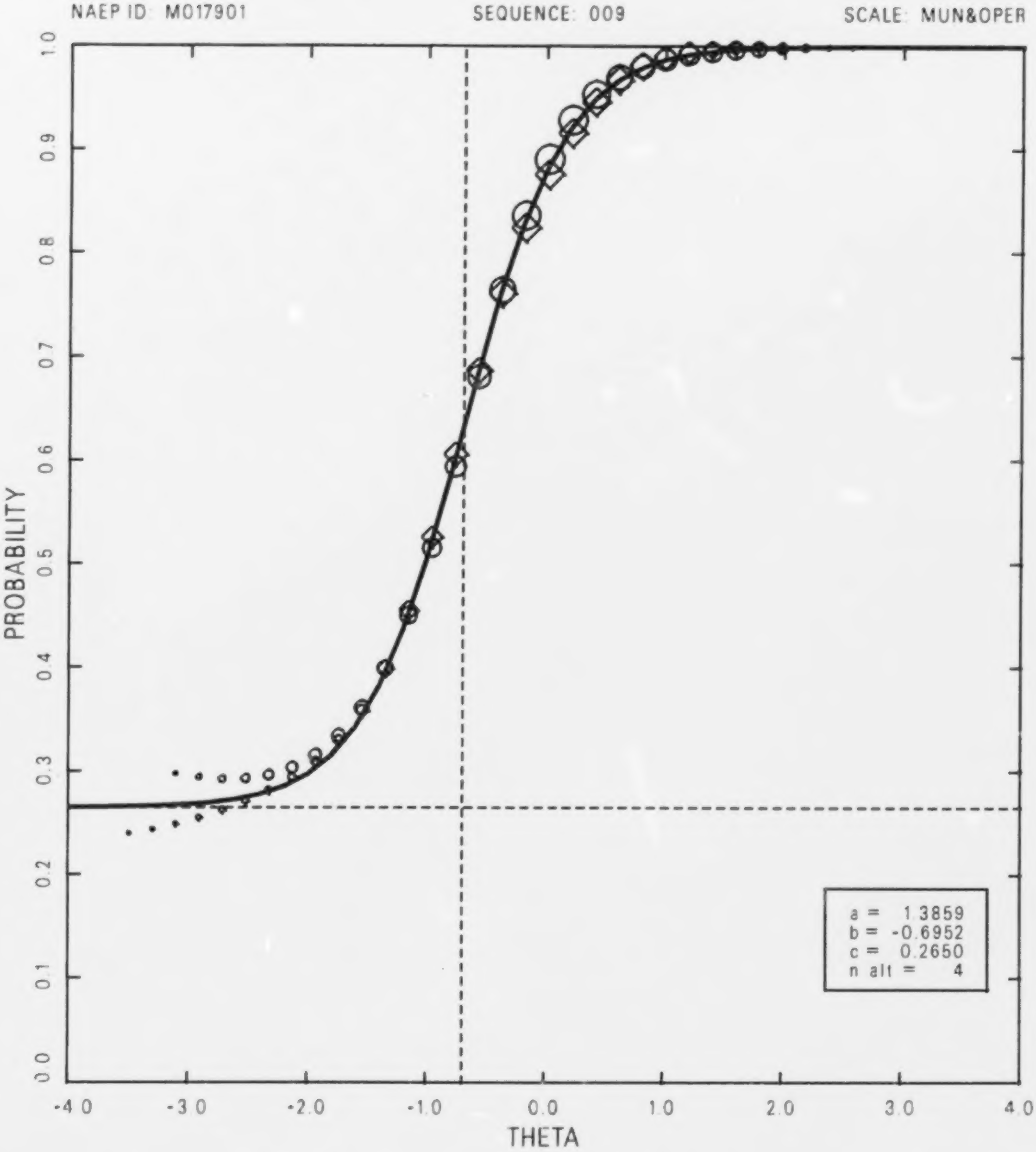
Second is an example of an item that displayed non-logistic empirical functions and was dropped. Figure 12-3 shows a polytomous item that was dropped from the assessment.

Third is an example of an item that changed function from one assess year to another. Figure 12-4 shows that the empirical item functions for two assessment years (diamonds for 1992 and circles for 1996) are distinctly different. Figures 12-5 and 12-6 show the result of estimating item parameters separately for the two years. This 'splitting' of the item across years results in quite good fit for each year.

The fourth example is of a poor fitting polytomous item that was modified by collapsing categories. Figure 12-7 shows a 5-category item which evidences poor fit mostly in the upper category, due in large part to a low number of respondents. As a result, the upper two categories were collapsed resulting in a 4-category item which, as Figure 12-8 illustrates, fits satisfactorily.

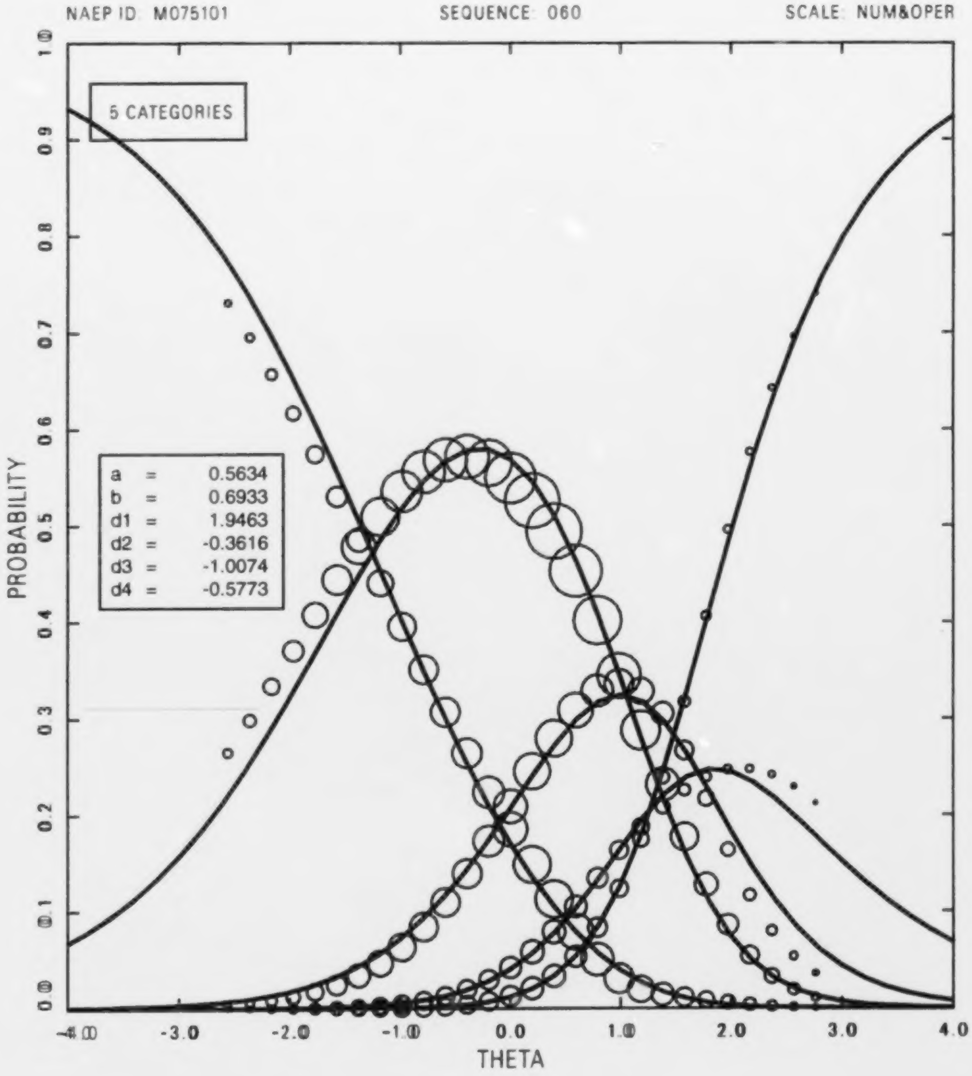
Figure 12-1

*Dichotomous Item Exhibiting Good Model Fit**



*Circles (1996 data) and diamonds (1992 data) indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

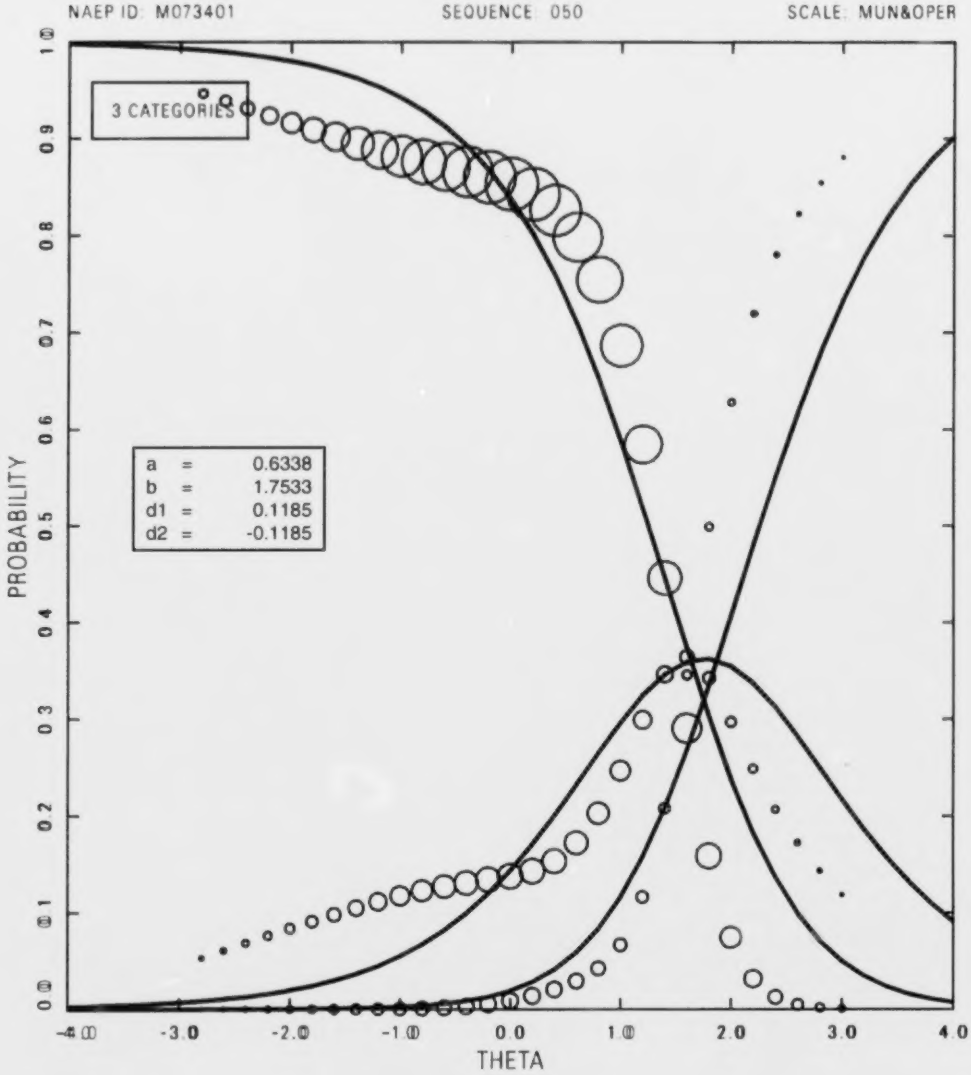
Figure 12-2
*Polytomous Item Exhibiting Good Model Fit**



*Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curves indicate estimated item response function assuming a model-based form.

Figure 12-3

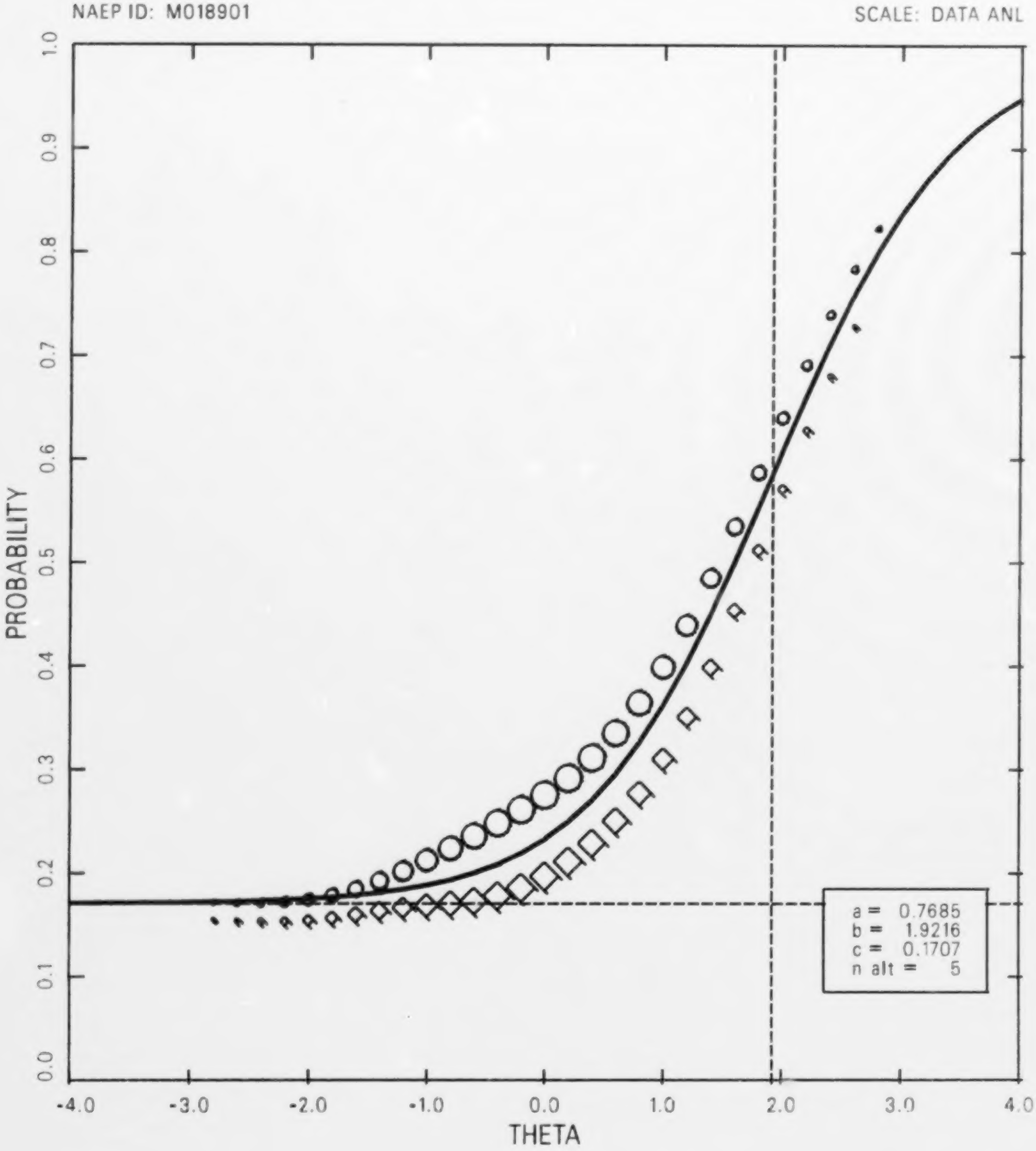
*Polytomous Item Exhibiting Bad Model Fit That Was Deleted from the Assessment**



*Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curves indicate estimated item response function assuming a model-based form.

Figure 12-4

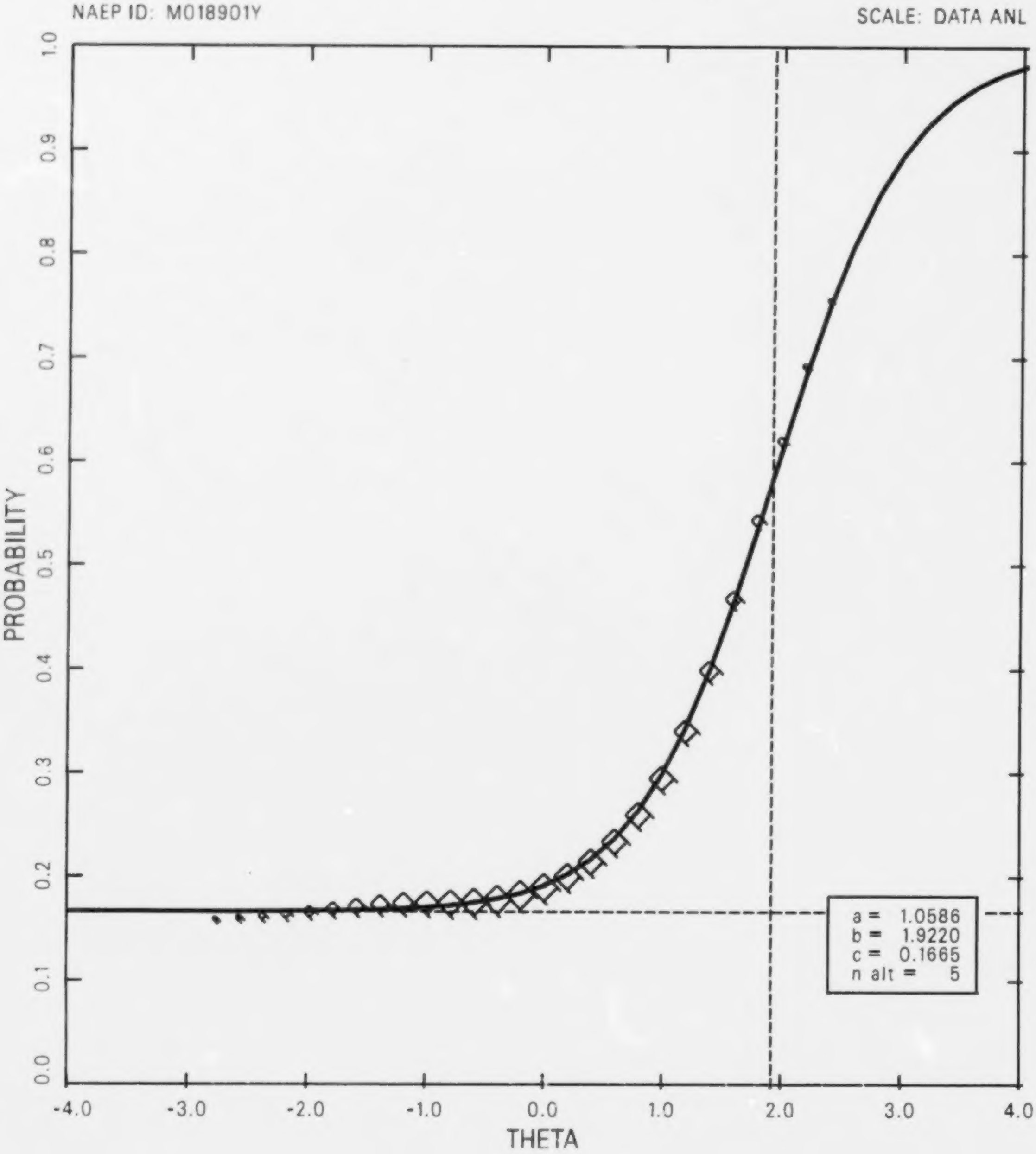
*Dichotomous Item Exhibiting Different Empirical Item Functions for Different Assessment Years**



*Diamonds represent 1992 data; circles represent 1996 data. Circles and diamonds indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 12-5

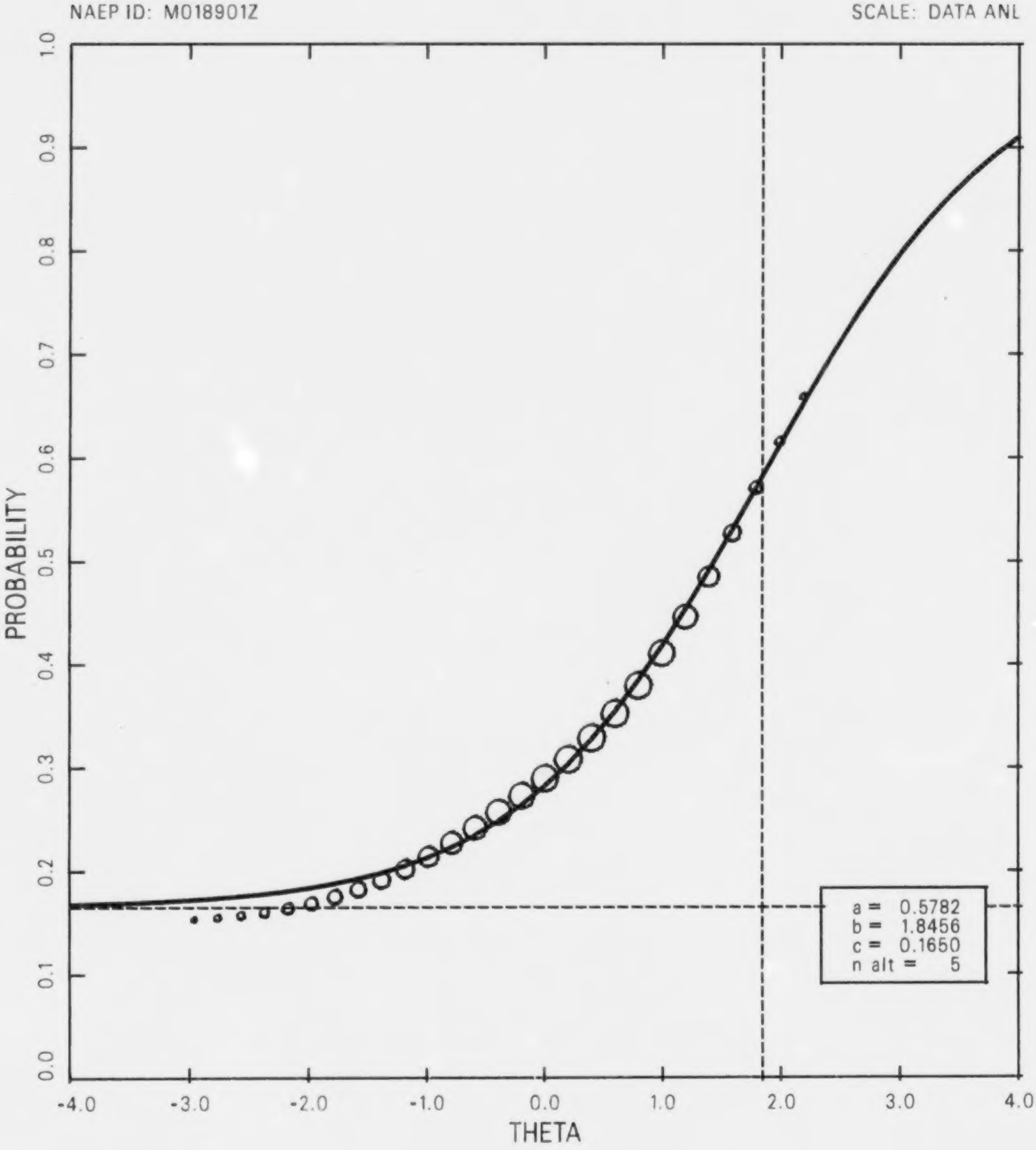
*Dichotomous Item Fit Separately to the 1992 Data and Exhibiting Good Model Fit**



*Diamonds indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 12-6

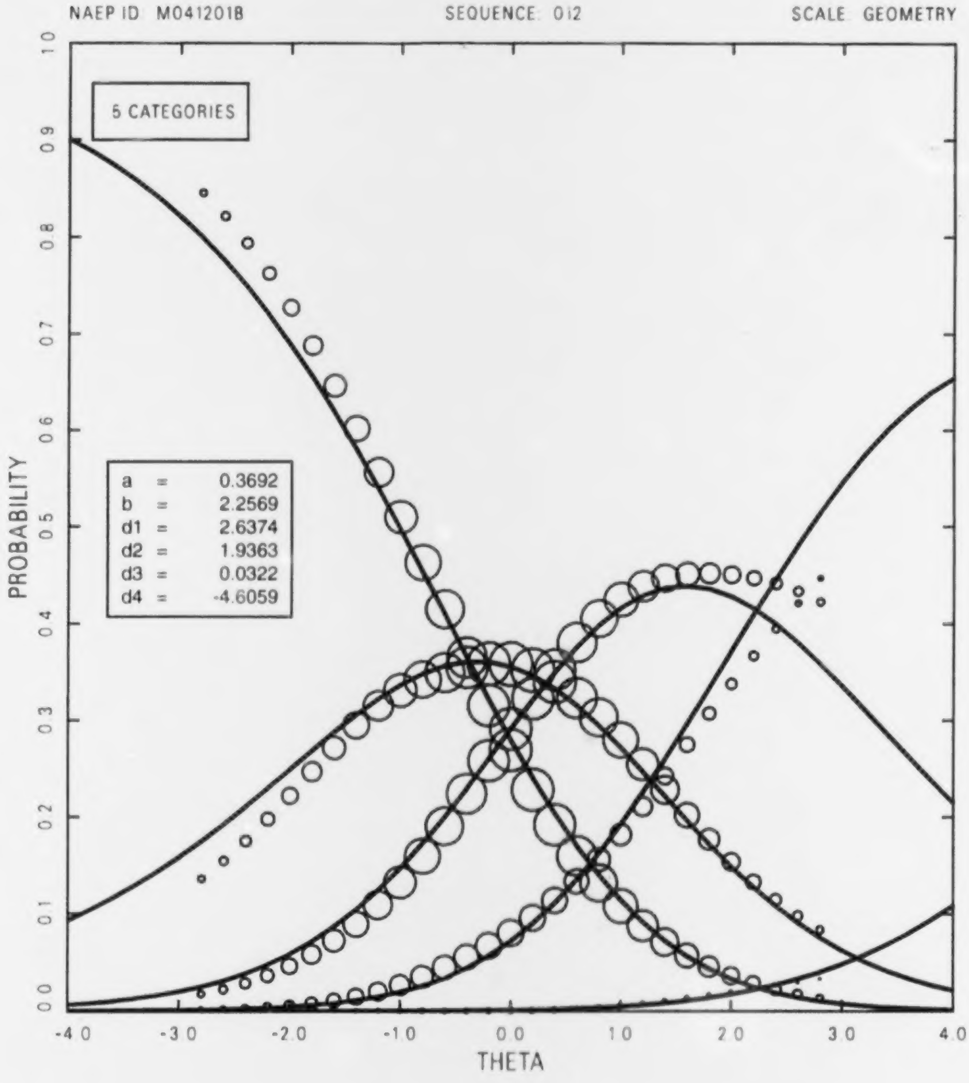
*Dichotomous Item Fit Separately to the 1996 Data and Exhibiting Good Model Fit**



*Circles indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 12-7

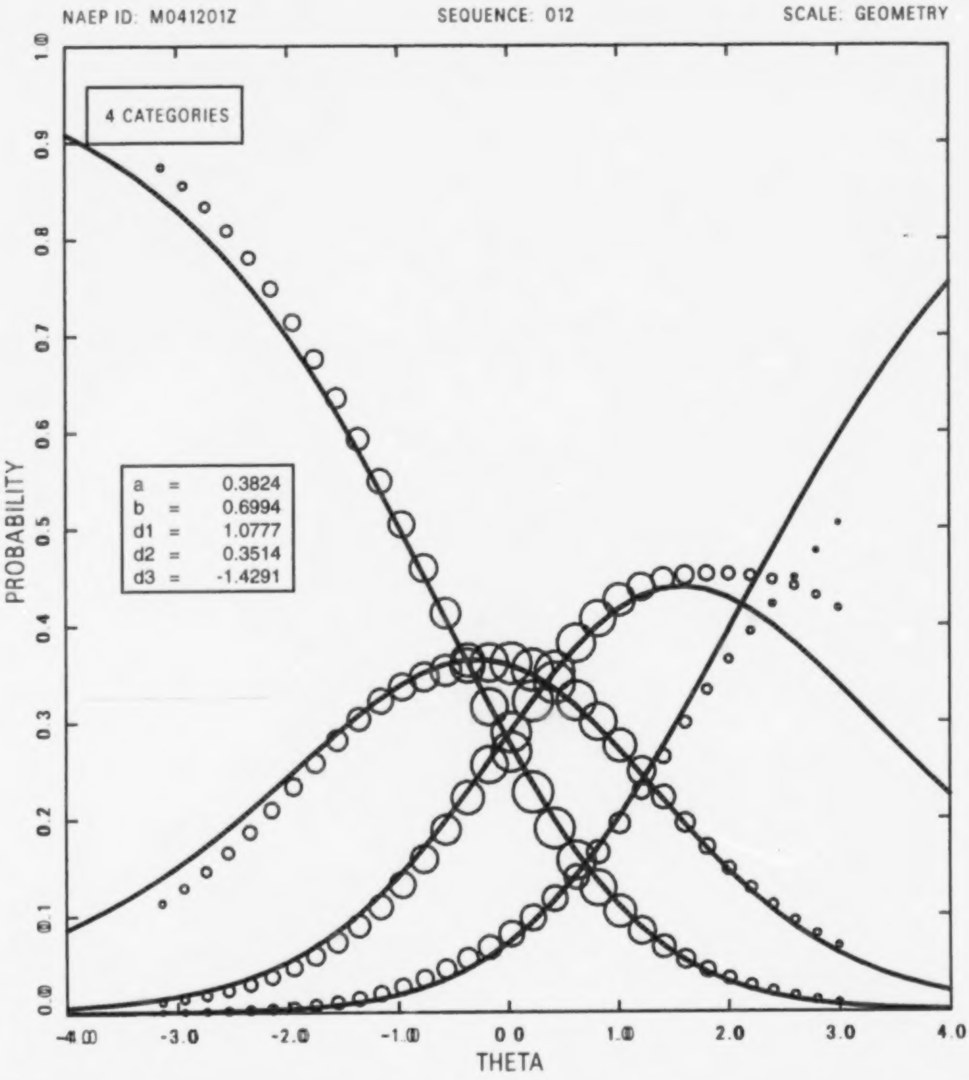
*Polytomous Item Exhibiting Poor Model Fit in the Upper Category**



*Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curves indicate estimated item response function assuming a model-based form.

Figure 12-8

*Polytomous Item With the Upper Two Categories Collapsed, Now Exhibiting Good Model Fit**



*Circles indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curves indicate estimated item response function assuming a model-based form.

12.5.5 Derived Background Variables

Derived variables are variables which use information from more than one background question. They were used for two purposes: as conditioning variables and as reporting variables used to define subgroups. Some of these variables are common to all the subject areas; others are specific to the 1996 mathematics assessment. Derived variables used for conditioning and reporting are described in Appendix C.

12.5.6 Generation of Plausible Values

For the entire sample, multivariate plausible values for content strand scales were generated for each grade group separately using the multivariate conditioning program CGROUP as revised by Thomas (1993). As with the scaling, student weights were used at this stage of the analysis. Instead of using selected background variables for conditioning variables (as had been done prior to the 1990 assessment), principal components of the background variables were used. The principal components used accounted for 90 percent of the variance of the original conditioning variables. Principal components were employed to remedy problems of extreme collinearity among some of the original conditioning variables.

Research based on data from the 1990 Trial State Assessment in mathematics suggests that results obtained using the 90 percent subset of components will differ only slightly from those obtained using the full set (Mazzeo, Johnson, Bowker, & Fong, 1992). Table 12-18 lists the number of principal components included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each grade.

Table 12-18

Proportion of Scale Score Variance Accounted for by the Conditioning Model for the Mathematics Main Assessment

			Proportion of Scale Score Variance				
Grade	**Number of Conditioning Contrasts**	**Number of Principal Components**	**Number Sense, Properties, and Operations**	**Measurement**	**Geometry and Spatial Sense**	**Data Analysis, Statistics, and Probability**	**Algebra and Functions**
4	895	321	.70	.71	.61	.75	.69
8	1,027	362	.71	.75	.68	.77	.73
12	812	314	.76	.79	.81	.70	.83

The codings of the original mathematics-specific conditioning variables, before principal components were calculated, are presented in Appendix C. The CGROUP program estimates distributions of scale scores by combining information from item responses of individuals and information from linear regression of scale score on conditioning variables. For each individual, five plausible values are randomly drawn from their predictive conditional distribution.

The proportion of variance of each original conditioning variable accounted for by the principal components included in the conditioning model is listed in Appendix F. The estimated conditioning effects for the principal components of the three samples defined by the three grade groups are also given in Appendix C. The values of the conditioning effects are expressed in the metrics of the original calibration scale. Definitions of derived conditioning variables are given in Appendix B.

12.5.7 The Transformation of the Mathematics Calibration Scale for Reporting and the Formation of the Composite Scale

Like all IRT scales, the mathematics content strand scales have a linear indeterminacy that may be resolved by an arbitrary choice of the origin and unit-size in each given content strand. In 1990 the NAEP mathematics data were scaled across grades separately for each scale. The linear indeterminacies among the scales were resolved by transforming the scale means and variances of three grade samples combined together to the 250.5[4], 50.0 metric using a transformation of the form,

$$\theta_{target} = A \bullet \theta_{calibrated} + B,$$

where A and B are linear transformation constants.

As a result, all of the scales that spanned all three grade samples were on a common scale. By contrast, the 1992 and 1996 data were scaled within grade. It was necessary, therefore, to transform data from both assessments to the 1990 cross-grade scale. This was accomplished first in the 1992 assessment, when the 1992 data were linked to the 1990 scale in a two-stage process. In the next assessment, the 1996 data were linked to the 1992 transformed scale, which in effect put the 1996 data on the 1990 cross-grade scale. The procedure for transforming the 1996 data will be described below. The similar procedure for transforming the 1992 data was presented in *The NAEP 1992 Technical Report* (Johnson and Carlson, 1994).

The 1996 data were put on the 1992 reporting metric by using a linear transformation that converts the 1996 thetas to the 1992 reporting scale. This linear transformation was created by the following procedure. The 1992 thetas were reconditioned using CGROUP with the 1996 item parameters. This analysis resulted in 1992 scores which were in the 1996 theta metric. We then transformed the new 1992 thetas (in the 1996 metric) to the 1992 reporting metric (in the 1992 metric) by a linear transformation which created scores having the same mean and variance as the 1992 reporting scale. This is a common population equating procedure. The linear constants of this transformation were then used to transform the 1996 thetas to the 1992 reporting metric. The transformation constants used for the five content strand scales and for the estimation scale are given in Table 12-19.

While scores in five content strands provide useful insights into the relationships among subpopulations, a single index to summarize overall performance is a useful tool for a compact overview of subpopulation trends. For that reason, a composite score was defined as a weighted average of the five mathematics content strands. The weight given to each content strand is a direct reflection of the relative testing time intended for that content strand in the assessment, as defined in the *Mathematics Framework for the 1996 National Assessment of Educational Progress* (National Assessment Governing Board, 1994). Since the emphasis given to each content strand was different across grades, the weights assigned to each strand in the composite also differed across grades.

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[4] The function $RP_x = 250 + 50(\theta_x)$ would have been preferable. Holland and Zwick (1986) have noted that the values actually used correspond to the b_i varying from -5.00 to $+4.98$ in steps of .02 instead of -4.99 to $+4.99$ as intended. The result is that the RP scores are a half-point higher than appropriate for the hypothetical test.

Table 12-19

Coefficients of the Linear Transformations that Transform the Five Content Strand Scales from the 1996 Calibration Metric to the 1992 Reporting Metric

Grade	Coefficient	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
4	B	220.32	226.02	224.70	223.38	223.63
	A	33.13	32.22	28.04	30.86	29.47
8	B	273.44	269.33	266.83	270.97	271.13
	A	35.12	43.65	33.54	41.00	35.52
12	B	300.43	300.85	304.67	301.03	303.42
	A	32.48	35.71	36.05	34.58	35.95

The definition of weights for the composite in each grade is given in Table 12-20. The mean and standard deviations of the composite scales for all three grades is given in Table 12-21. Note that this composite can be compared with the 1990 and 1992 composite scores since all three scales are on the 1990 cross-grade scale (as defined in the beginning of this section).

Table 12-20

Weights for the Mathematics Composite by Grade

Scale	Grade 4	Grade 8	Grade 12
Number Sense, Properties, and Operations	.40	.25	.20
Measurement	.20	.15	.15
Geometry and Spatial Sense	.15	.20	.20
Data Analysis, Statistics, and Probability	.10	.15	.20
Algebra and Functions	.15	.25	.25

Table 12-21

Means and Standard Deviations on the Mathematics Composite Scale

	All Five Plausible Values	
Grade	Mean	S. D.
4	223.9	31.2
8	272.0	36.4
12	304.0	32.2

12.5.8 Partitioning of the Estimation Error Variance

For each scale within each grade, the error variance of the reporting scale means was partitioned according to the procedure described in Chapter 11. The variance is partitioned into two parts; the proportion of error variance due to sampling students (sampling variance) and the proportion of error variance due to the fact that scale score, θ, is a latent variable that is estimated rather than observed. Table 12-22 contains estimates of the total error variance, the proportion of error variance due to sampling students and the proportion of error variance due to the latent nature of θ (for stability, the estimates of the between-imputation variance, B, in Equation 11.9). More detailed information by gender and race/ethnicity is presented in Appendix E.

Table 12-22

Estimation Error Variance and Related Coefficients for the Mathematics Main Assessment

Grade	Scale	Total Estimation Error Variance	Proportion of Variance Due to... Student Sampling	Latency of θ
4	Number Sense, Properties, and Operations	.88	.91	.09
	Measurement	1.25	.84	.16
	Geometry and Spatial Sense	.77	.82	.18
	Data Analysis, Statistics, and Probability	1.28	.87	.13
	Algebra and Functions	.99	.83	.17
	Composite	.78	.95	.05
8	Number Sense, Properties, and Operations	1.18	.91	.09
	Measurement	2.06	.87	.13
	Geometry and Spatial Sense	1.10	.91	.09
	Data Analysis, Statistics, and Probability	2.31	.92	.08
	Algebra and Functions	1.19	.89	.11
	Composite	1.13	.96	.04
12	Number Sense, Properties, and Operations	1.27	.93	.07
	Measurement	1.25	.84	.16
	Geometry and Spatial Sense	1.12	.88	.12
	Data Analysis, Statistics, and Probability	.99	.91	.09
	Algebra and Functions	1.33	.93	.07
	Composite	.99	.98	.02

12.5.9 Mathematics Teacher Questionnaire

Teachers of fourth- and eighth-grade students assessed in mathematics were surveyed. Variables derived from the questionnaire were used in the conditioning models for the grade 4 and the grade 8 samples, along with a variable that indicated whether a student record had been matched with a teacher record, so that means for subgroups defined by these variables could be compared with no bias. Of the 6,612 fourth-grade students in the main sample, 6,105 (92%) were matched with both parts of the teacher questionnaire and 99 (1.5%) were matched with only the first part of the questionnaire. Of the 7,146 eighth-grade students in the main sample, 6,144 (86%) were matched with both parts of the teacher questionnaire and 49 (less than 1%) were matched with only the first part of the questionnaire. Thus, 92 percent of the fourth graders and 86 percent of the eighth graders were matched with at least the background information about their mathematics teachers.

12.5.10 Analysis of Dimensionality

Plausible values are drawn from the set of five correlated content strands (see Section 12.5.6). For this reason, it is useful to inspect the correlations among the content strands for evidence of multidimensionality. Tables 12-23 and 12-24 give conditional and marginal correlations for the five scales for the three grades. Conditional correlations are analogous to pooled-within groups correlations when the groups are the grouping variables used to condition the data with CGROUP. They are obtained from the error correlations of a CGROUP analysis. The conditional correlations are quite high, averaging .85 for grade 4, .91 for grade 8, and .85 for grade 12. The marginal correlations are the average correlations of the five plausible values of each scale. In this case they average .86 for grade 4, .88 for grade 8, and .87 for grade 12. Although it is of substantive interest to analyze the scales separately, the correlations indicate that they are highly redundant.

Table 12-23

Conditional Correlations from Conditioning (CGROUP)

Grade	Scale	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
4	Number Sense, Properties, and Operations	1.00				
	Measurement	.89	1.00			
	Geometry and Spatial Sense	.80	.78	1.00		
	Data Analysis, Statistics, and Probability	96	.90	.75	1.00	
	Algebra and Functions	.94	.85	.78	.89	1.00
8	Number Sense, Properties, and Operations	1.00				
	Measurement	.92	1.00			
	Geometry and Spatial Sense	.79	.92	1.00		
	Data Analysis, Statistics, and Probability	.96	.95	.86	1.00	
	Algebra and Functions	.97	.95	.84	.96	1.00
12	Number Sense, Properties, and Operations	1.00				
	Measurement	.96	1.00			
	Geometry and Spatial Sense	.90	.94	1.00		
	Data Analysis, Statistics, and Probability	.84	.80	.67	1.00	
	Algebra and Functions	.91	.89	.88	.66	1.00

Table 12-24

Marginal Correlations of Science Scales[1]

Grade	Scale	Number Sense, Properties, and Operations	Measurement	Geometry and Spatial Sense	Data Analysis, Statistics, and Probability	Algebra and Functions
4	Number Sense, Properties, and Operations	1.00				
	Measurement	.89	1.00			
	Geometry and Spatial Sense	.84	.83	1.00		
	Data Analysis, Statistics, and Probability	.91	.86	.81	1.00	
	Algebra and Functions	.92	.86	.82	.86	1.00
8	Number Sense. Properties, and Operations	1.00				
	Measurement	.89	1.00			
	Geometry and Spatial Sense	.84	.89	1.00		
	Data Analysis, Statistics, and Probability	.91	.89	.85	1.00	
	Algebra and Functions	.92	.89	.86	.90	1.00
12	Number Sense, Properties, and Operations	1.00				
	Measurement	.90	1.00			
	Geometry and Spatial Sense	.90	.90	1.00		
	Data Analysis, Statistics, and Probability	.88	.86	.81	1.00	
	Algebra and Functions	.90	.87	.90	.80	1.00

[1] Tabled values were obtained by computing a separate Pearson correlation coefficient for each plausible value, computing Fisher's z-transformation for each value, computing the average of the transformed values, and computing the inverse transformation of the average.

Chapter 13

DATA ANALYSIS FOR THE SCIENCE ASSESSMENT[1]

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13.1 OVERVIEW

This chapter describes the analyses performed on the responses to the cognitive and background items in the 1996 assessment of science. These analyses led to the results presented in the *NAEP 1996 Science Report Card for the Nation and the States: Findings from the National Assessment of Educational Progress* (O'Sullivan, Reese, & Mazzeo, 1997). The emphasis of this chapter is on the methods and results of procedures used to develop the IRT-based scale scores that formed the basis of these reports. However, some attention is given to the analysis of constructed-response items as reported in the *NAEP 1996 Science Report Card for the Nation and the States*. The theoretical underpinnings of the IRT and plausible values methodology described in this chapter are given in Chapter 11, and several of the statistics are described in Chapter 9.

For 1996, the NAEP science assessment framework incorporated a balance of knowledge and skills based on current reform reports, exemplary curriculum guides, and research on the teaching and learning of science. The 1996 assessment included the use of hands-on science tasks and theme blocks as well as considerably more constructed-response items than previous NAEP assessments.

The student samples that were administered science items in the 1996 assessment are shown in Table 13-1. Chapters 1 and 3 contain descriptions of the target populations and the sample design used for the assessment.

Table 13-1

NAEP 1996 Science Student Samples

Sample	Booklet IDs Number	Mode	Cohort Assessed	Time of Testing[1]	Number Assessed
4 [Science Main]	201-237	Print	Grade 4	1/3/96 - 3/29/96 (Winter)	7,305
8 [Science Main]	201-237	Print	Grade 8	1/3/96 - 3/29/96 (Winter)	7,774
12 [Science Main]	201-237	Print	Grade 12	1/3/96 - 3/29/96 (Winter)	7,537
12 [Sci-Advanced]	238-240	Print	Grade 12	1/3/96 - 3/29/96 (Winter)	2,431

[1]Final makeup sessions were held April 1-5, 1996.

LEGEND:

Print	Printed administration
Main	Main assessment
Advanced	Assessment with advanced booklets

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[1] John Donoghue was the primary person responsible for the planning, specification, and coordination of the science analyses. He was assisted by Jinming Zhang. Computer activities for all science scaling and data analyses were directed by Steve Isham and completed by Lois Worthington and Ingeborg Novatkoski. Others contributing to the analysis of science data were David S. Freund, Katharine Pashley, and Norma A. Norris.

The objectives of the science analyses were to

- prepare scale values and estimate subgroup proficiency distributions for national samples of students who were administered science items from the main assessment, and

- prepare the analysis of the advanced science assessment. The advanced science sample 12[Sci-Advanced] is a separate sample from the 12[Science Main] sample. Analyses of the advanced science assessment will be described in a subsequent NAEP report. The 12[Sci-Advanced] sample is discussed further in section 13-3.

The 1996 science samples were analyzed to provide comparisons of science achievement for various subgroups of the 1996 target populations. The target populations were grade 4, grade 8, and grade 12 students in the United States. Unlike previous NAEP assessments, only grade-defined cohorts were assessed in the 1996 NAEP. The age of students was based on a calendar year, with birthdates in 1986, 1982, and 1978, respectively, for ages 9, 13, and 17. The sampled students in each of these three cohorts were assessed in the winter (January to March with final makeup sessions held during the first week of April). As described in Chapter 9, the reporting sample for the national science assessment consisted of students in the S2 sample (also see Chapter 19 for tables describing the students assessed and the reporting sample for each component of the science assessment).

The major analysis components are discussed in turn. Some aspects of the analysis, such as procedures for item analysis, scoring of constructed-response items, and methods of scaling, are described in previous chapters and are therefore not detailed here. There were five major steps in the analysis of the science data, each of which is described in a separate section:

1. conventional item and test analyses, and DIF analyses (Section 13.4);
2. item response theory (IRT) scaling (Section 13.5);
3. estimation of subgroup proficiency distributions based on the "plausible values" methodology (Section 13.6);
4. transforming the 1996 assessment scales to the final reporting metric for each of the fields of science, and (Section 13.7.1); and
5. creation of the science composite scale (Section 13.7.2).

Section 13.8 describes the results of partitioning the error variance, 13.9 discusses the matching of student responses to those of their teachers, and 13.10 provides a brief explanation of sampling weights.

To set the context within which to describe the methods and results of scaling procedures, a brief review of the assessment instruments and administration procedures is provided.

13.2 DESCRIPTION OF ITEMS AND ASSESSMENT BOOKLETS

The 1996 NAEP main science assessment differed from the long-term trend assessment in regard to the sample age definition, time of testing, the objectives that define the emphasis of the assessment, and most of the items used. It also differed from the 1990 main NAEP science assessment in the same regards. Because of these differences, equating or linking the main and the long-term trend assessments was not appropriate. Neither is a direct comparison to the results of the 1990 main science assessment. The 1996 main science assessment can be used to start a new baseline for measuring trends in the nation.

The pool of items used in the 1996 science assessment contained a range of constructed-response and multiple-choice questions measuring performance on sets of objectives. The items in the assessment were based on the curriculum framework described in *Science Framework for the 1996 National Assessment of Educational Progress* (National Assessment Governing Board, 1993). The total number of scaled items was 136, 190, and 186, respectively, for grades 4, 8, and 12. Note that some items overlap across grade. Each of the items was classified into one of three fields of science: *earth science*; *physical science*; and *life science*. These three fields of science constituted the scales used in 1996 reporting. Table 13-2 shows the numbers of items within content area scales for each grade. The numbers presented in Table 13-2 show item counts both for the original item pool, and after the necessary adjustments were made during scaling (see Section 13.5.2, below).

Table 13-2

Number of Items in Scales in the Science Main Assessment by Field of Science

Grade		Physical Science	Earth Science	Life Science	Total
4	Pre-Scaling	45	53	47	145
	Post-Scaling	43	49	44	136
8	Pre-Scaling	63	65	66	194
	Post-Scaling	62	63	65	190
12	Pre-Scaling	60	64	66	190
	Post-Scaling	59	62	65	186

For each grade, the items were divided into 15 mutually exclusive, separately timed blocks. At grade 4, students were given 20 minutes to complete each block; at grades 8 and 12 each block required 30 minutes. As described in Chapter 2, the blocks were combined into booklets according to a complex spiraling design. (See Chapter 4 for more information about the blocks and booklets.) Each student's booklet contained three blocks of cognitive items. Four of the 15 blocks were hands-on tasks in which students were given a set of equipment and asked to conduct an investigation and answer questions (mostly constructed-response) relating to the investigation. These hands-on tasks were always presented in the last position, after two paper-and-pencil blocks. Three of the remaining 11 blocks were theme blocks. Theme blocks were placed randomly in student booklets, but not in every booklet. No student received more than one theme block. Each theme block was paired with each non-theme paper-and-pencil block just once. Each paper-and-pencil block appeared in the first or second position the same number (3 or 4) of times. For each of the grades, the composition of each block of items, in terms of content and format, is given in Tables 13-3 through 13-5.[2] Common labeling of these blocks across grade levels does not denote common items.

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[2] The numbers in Tables 13-2 through 13-8 differ slightly from those given in Chapter 2. The numbers in Chapter 2 do not reflect the grouping of certain sets of items into cluster items for the purposes of scaling.

Table 13-3

1996 NAEP Science Block Composition by Item Type, Grade 4, As Defined Before Scaling

		Constructed-Response Items Scored Polytomously					
Block	Multiple-Choice Items	2-category	3-category	4-category	5-category	Cluster Items	Total Items
S3	0	1	6	0	0	0	7
S4	1	4	1	1	0	0	7
S5	2	0	4	1	1	0	8
S6	0	0	3	2	0	0	5
S7	2	0	7	1	0	0	10
S8	1	0	7	0	1	0	9
S9	2	0	6	1	0	0	9
S10	6	0	6	0	0	0	12
S11	6	1	4	0	0	0	11
S12	6	0	8	1	0	0	15
S13	6	0	4	1	0	0	11
S14	5	0	5	0	0	0	10
S15	3	0	5	1	0	0	9
S20	6	0	2	3	0	0	11
S21	5	0	4	1	1	0	11
Total	**51**	**6**	**72**	**13**	**3**	**0**	**145**

Table 13-4

1996 NAEP Science Block Composition by Item Type, Grade 8, As Defined Before Scaling

		Constructed-Response Items Scored Polytomously					
Block	Multiple-Choice Items	2-category	3-category	4-category	5-category	Cluster Items	Total Items
S3	0	0	4	1	0	1	6
S4	3	0	4	3	0	0	10
S5	0	0	8	0	0	0	8
S6	0	0	5	2	0	0	7
S7	2	2	8	0	0	0	12
S8	5	0	5	0	0	0	10
S9	3	0	9	1	0	0	13
S10	8	1	6	1	0	0	16
S11	8	0	7	1	0	0	16
S12	8	1	5	2	0	0	16
S13	8	0	7	1	0	0	16
S14	7	0	8	0	0	1	16
S15	7	1	6	1	1	0	16
S20	8	0	6	2	0	0	16
S21	7	0	7	2	0	0	16
Total	**74**	**5**	**95**	**17**	**1**	**2**	**194**

Table 13-5

1996 NAEP Science Block Composition by Item Type, Grade 12, As Defined Before Scaling

		Constructed-Response Items Scored Polytomously					
Block	**Multiple-Choice Items**	**2-category**	**3-category**	**4-category**	**5-category**	**Cluster Items**	**Total Items**
S3	0	0	4	1	1	0	6
S4	0	0	1	1	2	0	4
S5	0	1	7	0	0	0	8
S6	0	1	5	1	1	0	8
S7	5	0	7	3	0	0	15
S8	6	0	7	0	0	0	13
S9	4	0	8	1	1	0	14
S10	8	0	9	1	0	0	18
S11	8	1	4	3	0	0	16
S12	8	1	5	2	0	0	16
S13	8	0	7	1	0	0	16
S14	8	0	6	1	1	0	16
S15	0	1	5	2	0	0	8
S20	7	0	6	3	0	0	16
S21	8	0	4	4	0	0	16
Total	**70**	**5**	**85**	**24**	**6**	**0**	**190**

Some items (fewer than 10%) received special treatment during scaling. For each of the grades, Tables 13-6 through 13-8 show the composition of each block after deletions of items and collapsing of categories for polytomously-scored constructed-response items as a result of scaling. If data had poor fit with the response model for an item, the item was deleted. If a constructed-response item was scored in multiple categories but one category had no (or very few) responses, or one of the categories had responses that had poor fit to the response model, that category was combined with other categories ("collapsed"). All item deletions and all but one category collapse were performed in the course of scaling the national science assessment data; the remaining collapse was performed based on data in State Assessment, with the same collapse performed for the national scaling. In addition, categories of a small number of items were combined These changes were made so that the scaling model used for these items fit the data more closely, and are described more fully in Section 13.5.

For grade 4, each of the 11 paper-and-pencil blocks contained from five to nine constructed-response items. Seven of these blocks contained one or more constructed-response items scored on a 0-3 scale. Two items were scored on a 0-4 scale. The four hands-on task blocks contained from five to seven constructed-response items and up to two multiple-choice items.

For grade 8, each of the 11 paper-and-pencil blocks contained from five to ten constructed-response items. Eight of these blocks contained one or more constructed-response items scored on a 0-3 scale. One item was scored on a 0-4 scale. The four hands-on task blocks contained from six to eight constructed-response items. One of these blocks also contained three multiple-choice items.

For grade 12, each of the 11 paper-and-pencil blocks contained from seven to ten constructed-response items. Ten of these blocks contained one or more constructed-response items scored on a 0-3 scale. Two items were scored on a 0-4 scale. The four hands-on task blocks contained from four to eight constructed-response items. None of these blocks contained multiple-choice items.

Table 13-6

*1996 NAEP Science Block Composition by Item Type, Grade 4, As Defined After Scaling**

Block	Multiple-Choice Items	Constructed-Response Items Scored Polytomously 2-category	3-category	4-category	5-category	Cluster Items	Total Items
S3	0	1	4	0	0	1	6
S4	1	5	1	0	0	0	7
S5	2	0	4	0	1	0	7
S6	0	0	3	1	0	0	4
S7	2	3	4	1	0	0	10
S8	1	0	7	0	1	0	9
S9	1	0	7	0	0	0	8
S10	6	0	4	0	0	1	11
S11	6	2	3	0	0	0	11
S12	6	0	5	0	0	0	11
S13	6	1	3	1	0	0	11
S14	5	0	5	0	0	0	10
S15	3	0	5	1	0	0	9
S20	6	0	2	3	0	0	11
S21	5	1	3	1	1	0	11
Total	**50**	**13**	**60**	**8**	**3**	**2**	**136**

*Counts reflect items that were dropped and collapsed.

Table 13-7

*1996 NAEP Science Block Composition by Item Type, Grade 8, As Defined After Scaling**

Block	Multiple-Choice Items	Constructed-Response Items Scored Polytomously 2-category	3-category	4-category	5-category	Cluster Items	Total Items
S3	0	1	3	1	0	1	6
S4	2	1	4	1	0	1	9
S5	0	1	7	0	0	0	8
S6	0	1	4	1	0	0	6
S7	2	4	6	0	0	0	12
S8	5	1	4	0	0	0	10
S9	3	2	7	1	0	0	13
S10	8	1	7	0	0	0	16
S11	8	1	6	1	0	0	16
S12	8	1	5	2	0	0	16
S13	8	1	4	1	0	1	15
S14	7	0	8	0	0	1	16
S15	6	1	6	1	1	0	15
S20	8	2	4	2	0	0	16
S21	7	0	7	2	0	0	16
Total	**72**	**18**	**82**	**13**	**1**	**4**	**190**

* Counts reflect items that were dropped and collapsed.

Table 13-8

*1996 NAEP Science Block Composition by Item Type, Grade 12, As Defined After Scaling**

		Constructed-Response Items Scored Polytomously					
Block	Multiple-Choice Items	2-category	3-category	4-category	5-category	Cluster Items	Total Items
S3	0	1	4	1	0	0	6
S4	0	0	2	2	0	0	4
S5	0	2	6	0	0	0	8
S6	0	4	2	1	1	0	8
S7	5	3	5	2	0	0	15
S8	6	2	4	0	0	0	12
S9	4	3	5	1	1	0	14
S10	8	0	9	1	0	0	18
S11	8	1	4	3	0	0	16
S12	8	1	5	2	0	0	16
S13	8	0	5	1	0	1	15
S14	8	0	6	2	0	0	16
S15	0	2	4	2	0	0	8
S20	6	0	6	2	0	0	14
S21	8	0	4	4	0	0	16
Total	**69**	**19**	**71**	**24**	**2**	**1**	**186**

* Counts reflect items that were dropped and collapsed.

All constructed-response items were scored by specially trained readers, as described in Chapter 5. In addition, a small number of "cluster items" were formed. A cluster item is an aggregation of a group of items (in the case of NAEP science, typically two to four items) that are related to a single content strand, topic, or stimulus, and are developed and scored as a single unit (see Wainer & Kiely, 1987, for further details and examples of different types of cluster items). Some items were initially scored as cluster items, and the additional clusters were formed in scaling due to data dependencies.

In the main samples, each student was administered a booklet containing two paper-and-pencil blocks and one block consisting of a hands-on task. In addition, the booklet contained a block of background questions common to all booklets for a particular grade level, a block of questions concerning the student's motivation and his or her perception of the difficulty of the cognitive items, and a block of science-related background questions common to all science booklets for a particular grade level.

The design of the 1996 science assessment required that each student be administered one of the 37 booklets in the design. Within each administration site, all booklets were "spiraled" together in a random sequence and distributed to students sequentially, in the order of the students' names on the Student Listing Form (see Chapter 4). As a result of the design and the spiraling of booklets, a considerable degree of balance was achieved in the data collection process. Each block of items (and, therefore, each item) was administered to randomly equivalent samples of students.

13.3 SPECIAL SCIENCE ASSESSMENT

As stated previously, there was a special study in the 1996 national NAEP assessment in addition to the main and long-term trend assessments. This was the advanced study, denoted by the 12[Sci-Advanced] sample in Table 13-1. This study examined the performance of twelfth-grade students who were taking advanced science courses. Students were assessed for approximately two hours, and each student received four cognitive blocks, consisting of a common block (SS, composed of 18 items) and three special blocks (each composed of 16 items) designed to assess advanced material. Each block assessed specific science content: one block for physics, one for chemistry, and one for life sciences. The common block was composed of items from the main assessment, although these items were drawn from several different blocks from the main assessment. The block structure of the special study booklets is provided in Table 13-9. In addition to the cognitive blocks, the special study booklets had three blocks in common with the main assessment:

1. a general student background block (CS)
2. a science background block (SB), and
3. a motivation block (SX).

Table 13-9

Block Structure of the 12[Sci-Advanced] Special Study Booklets

Booklet IDs	Cognitive Blocks First	Second	Third	Fourth
238	SS	SR	SV	SP
239	SS	SV	SP	SR
240	SS	SP	SR	SV

The advanced study was not part of the main assessment and analyses for these booklets will be described in an NCES publication by Christine O'Sullivan to be published in the third quarter of 1999. Therefore, the special 12[Sci-Advanced] sample will not be discussed further in this chapter.

13.4 ITEM ANALYSES

13.4.1 Conventional Item and Test Analyses

This section contains a detailed description of the conventional item analysis performed on the science data. This analysis was done within block so that a student's score is the sum of item scores in a block. Dichotomous items (multiple-choice and 2-category constructed-response) were scored as right or wrong. Polytomous items were not scored right/wrong but were scored with three or more categories reflecting several degrees of knowledge.

Tables 13-10, 13-11, and 13-12 show the number of items, average weighted item score, average weighted item-to-total score correlation (biserial or polyserial), and weighted alpha reliability for each block administered at each grade level for the main assessment. The table also gives the number of students who were administered the block and the weighted percent reaching the last item in the block. Student sampling weights were used to compute all statistics except for the sample sizes. Preliminary item analyses for all items within a block were completed before scaling; however, the results shown here reflect the characteristics of the items that contributed to the final science scales.

Table 13-10

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Science Main Sample, Grade 4, As Defined After Scaling

Statistic	Position	S7	S8	S9	S10	S11	S12	S13	S14	S15	S20	S21
Number of scaled items		10	9	8	11	11	11	11	10	9	11	11
Unweighted sample size												
	1	812	804	747	630	608	609	607	782	577	561	557
	2	745	822	749	578	595	593	616	798	599	608	583
	ALL	1557	1626	1496	1208	1203	1202	1223	1580	1176	1169	1140
Weighted average item score												
	1	.47	.47	.38	.46	.52	.48	.55	.32	.31	.49	.49
	2	.46	.47	.37	.47	.52	.47	.52	.30	.29	.47	.45
	ALL	.47	.47	.38	.47	.52	.48	.53	.31	.30	.48	.47
Weighted alpha reliability												
	1	.69	.57	.58	.67	.64	.73	.62	.50	.53	.61	.64
	2	.69	.52	.61	.67	.69	.76	.66	.49	.53	.65	.67
	ALL	.69	.55	.59	.67	.67	.74	.64	.49	.53	.63	.66
Weighted average r-polyserial												
	1	.59	.57	.61	.57	.61	.62	.53	.53	.59	.54	.59
	2	.59	.57	.64	.57	.64	.66	.57	.54	.60	.58	.60
	ALL	.59	.57	.63	.57	.62	.64	.55	.54	.60	.56	.60
Weighted proportion of students attempting last item												
	1	.87	.63	.79	.85	.88	.87	.87	.79	.73	.80	.56
	2	.91	.74	.85	.87	.87	.93	.92	.84	.80	.88	.71
	ALL	.88	.68	.82	.86	.88	.90	.90	.82	.77	.84	.63

Table 13-11

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Science Main Sample, Grade 8, As Defined After Scaling

Statistic	Position	S7	S8	S9	S10	S11	S12	S13	S14	S15	S20	S21
Number of scaled items		12	10	13	16	16	16	15	16	15	16	16
Unweighted sample size												
	1	833	838	830	631	649	638	629	836	625	627	622
	2	828	849	843	609	621	634	640	846	630	619	621
	ALL	1661	1687	1673	1240	1270	1272	1269	1682	1255	1246	1243
Weighted average item score												
	1	.45	.57	.49	.35	.43	.33	.41	.42	.37	.42	.44
	2	.43	.54	.47	.33	.42	.33	.38	.42	.36	.42	.42
	ALL	.44	.55	.48	.34	.43	.33	.40	.42	.37	.42	.43
Weighted average r-polyserial												
	1	.76	.65	.68	.61	.71	.70	.59	.72	.70	.70	.72
	2	.75	.64	.68	.64	.71	.73	.61	.74	.69	.70	.71
	ALL	.75	.65	.68	.63	.71	.71	.61	.73	.70	.70	.72
Weighted alpha reliability												
	1	.65	.68	.58	.47	.52	.52	.45	.54	.55	.51	.52
	2	.65	.66	.57	.50	.52	.54	.46	.56	.54	.52	.51
	ALL	.65	.67	.58	.49	.52	.53	.46	.55	.55	.51	.51
Weighted proportion of students attempting last item												
	1	.89	.97	.96	.92	.84	.82	.92	.96	.89	.86	.88
	2	.89	.97	.93	.90	.83	.82	.89	.96	.85	.84	.88
	ALL	.89	.97	.95	.91	.84	.82	.90	.96	.87	.85	.88

Table 13-12

Descriptive Statistics for Item Blocks by Position Within Test Booklet and Overall Occurrences for the Science Main Sample, Grade 12, As Defined After Scaling

Statistic	Position	S7	S8	S9	S10	S11	S12	S13	S14	S15	S20	S21
Number of scaled items		15	12	14	18	16	16	15	16	8	14	16
Unweighted sample size												
	1	813	835	750	613	651	603	626	830	583	601	611
	2	783	842	801	602	571	609	591	838	597	645	619
	ALL	1596	1677	1551	1215	1222	1212	1217	1668	1180	1246	1230
Weighted average item score												
	1	.49	.56	.44	.37	.47	.48	.50	.40	.17	.41	.42
	2	.49	.56	.41	.35	.45	.46	.51	.40	.17	.41	.42
	ALL	.49	.56	.43	.36	.46	.47	.50	.40	.17	.41	.42
Weighted alpha reliability												
	1	.76	.56	.79	.76	.67	.77	.64	.75	.62	.70	.72
	2	.78	.63	.80	.77	.66	.78	.69	.76	.62	.69	.73
	ALL	.77	.59	.80	.76	.67	.77	.67	.75	.62	.70	.72
Weighted average r-polyserial												
	1	.63	.61	.62	.57	.46	.58	.54	.58	.69	.54	.54
	2	.65	.64	.65	.58	.47	.58	.57	.58	.69	.53	.55
	ALL	.64	.63	.64	.58	.47	.58	.55	.58	.69	.53	.54
Weighted proportion of students attempting last item												
	1	.80	.93	.82	.87	.92	.81	.91	.85	.79	.79	.91
	2	.79	.92	.88	.85	.95	.80	.93	.87	.77	.80	.86
	ALL	.80	.92	.85	.86	.93	.81	.92	.86	.78	.80	.88

As described in Chapter 9, in NAEP analyses (both conventional and IRT-based), a distinction is made between missing responses at the end of each block (not reached) and missing responses prior to the last observed response (omitted). Standard practice at ETS is to treat all nonrespondents to the last item as if they had not reached the item. Items that were not reached were treated as if they had not been presented to the examinee, while omitted items were regarded as incorrect. The proportion of students attempting the last item of a block (or, equivalently, one minus the proportion not reaching the last item) can be used as an index of the degree of speededness of the block of items.

As is evident from Tables 13-10 through 13-12, the difficulty and the average item-to-total correlations of the blocks varied somewhat. Such variability was expected since these blocks were not created to be parallel in either difficulty or content. Based on the proportion of students attempting the last item, no block seemed to be speeded, by the criterion of a proportion less than .8 attempting the last item. The most speeded block showed 84 percent of the students reaching the last item in the block.

For the 11 paper-and-pencil blocks, small but consistent differences were noted based upon whether a block occurred in the first or second position within a booklet. When the block appeared first in the booklet, the average item score tended to be higher and the average polyserial correlation tended to be lower. The largest differences were noted in the proportion of students not attempting the last item in the block; more students attempted the last item when the block appeared in the second position. It appears that the students learned to pace themselves through the second block, based on their experience with the first block. Similar effects (slightly larger) were noted in the 1992 NAEP reading assessment (Donoghue, 1994). At that time, a study was completed to examine the effect of the serial position differences. Due to the balance of the complex design of the booklets, the serial position differences were found to have minimal effects on scaling.

13.4.2 Scoring the Constructed-Response Items

As indicated in Table 13-4 through 13-6, about two-thirds of the science items were constructed-response. Two-category constructed-response items were given a right/wrong scoring. The categories of responses for the items and the number of responses that were rescored for each item are indicated in Appendix I. The percent agreement for the raters and Cohen's (1968) Kappa, a reliability estimate appropriate for items that are dichotomized, are also given in the tables. For grades 4 and 12, a 20 percent sample was used in calculating the reliability. At grade 8, the national and State Assessment data were combined. A 6 percent sample of these combined data was used to calculate the reliability results.

In general, the rater reliability of the scoring for dichotomized responses was quite high. Cohen's Kappa reliabilities ranged over items from .86 to .93 for grade 4, from .75 to .96 for grade 8, and from .71 to .95 for grade 12.

Chapter 7 discusses the definition of the item ratings and describes the process by which teams of raters scored the constructed-response items. This discussion includes the rating definitions for regular, short and extended constructed-response items as well as the range of interrater reliabilities that were obtained. Extended constructed-response items were scored on a scale from 1 to 5 to reflect degrees of knowledge. In scaling, this scale is shifted to 0 to 4. Rating information on extended constructed-response items can be found in Appendix I, which lists the sample sizes, percent agreement, and Cohen's Kappa reliability index.

13.4.3 Differential Item Functioning

A differential item functioning (DIF) analysis of the science items was done to identify potentially biased items. Sample sizes were large enough to compare male and female students, White and Black students, and White and Hispanic students. The purpose of the analysis was to identify items that should be examined more closely by a committee of trained test developers and subject-matter specialists for possible bias and consequent exclusion from the assessment. The presence of DIF in an item means that the item is differentially harder for one group of students than another, while controlling for the ability level of the students.

For dichotomous items, the Mantel-Haenszel procedure as adapted by Holland and Thayer (1988) was used as a test of DIF (this is described in Chapter 9). The Mantel procedure (Mantel, 1963) was used for detection of DIF in polytomous items and also as described by Zwick, Donoghue, and Grima (1993). This procedure assumes ordered categories.

For DIF analyses, weights were rescaled separately for each comparison, as described in Chapter 9. DIF analyses were conducted separately by grade. For dichotomous items, the DIF index generated by the Mantel-Haenszel procedure was used to place items into one of three categories: "A," "B," or "C." "A" items exhibit no DIF, "B" items exhibit a weak indication of DIF, and "C" items exhibit a strong indication of DIF. "C" items were examined by a DIF committee for presence of bias.

Table 13-13 summarizes the results of the DIF analyses for dichotomous items. Focal groups are female, Black, and Hispanic groups.

Table 13-13

DIF Category by Grade for Dichotomous Items

Grade	DIF Category[1]		Analysis	
		Male/Female	White/Black	White/Hispanic
4	C-	3	0	0
	B-	13	4	1
	A-	21	26	33
	A+	19	26	23
	B+	2	2	1
	C+	0	0	0
8	C-	3	0	0
	B-	10	6	2
	A-	41	33	34
	A+	23	40	43
	B+	4	2	2
	C+	0	0	0
12	C-	1	0	0
	B-	13	4	2
	A-	38	31	33
	A+	22	35	41
	B+	5	9	3
	C+	0	0	0

[1] Positive values of the index indicate items that are differentially easier for the focal group (female, Black, or Hispanic students) than for the reference groups (male or White students). "A+" or "A-" means no indication of DIF, "B+" means a weak indication of DIF in favor of the focal group, "B-" means a weak indication of DIF in favor of the reference group and "C+" or "C-" means a strong indication of DIF.

Positive values indicate items that were differentially easier for the focal group. Table 13-14 summarizes the results of the DIF analyses for polytomous items. Again, focal groups are female, Black, and Hispanic groups, and positive values indicate that the item was differentially easier for the focal group. The Mantel statistic provides a statistical test of the hypothesis of no DIF. To aid in interpreting the results for polytomous items, the standardized mean difference between focal and reference groups was produced. This statistic was rescaled by dividing the standardized mean differences by the standard deviation of the respective item. The description of this procedure can be found in Chapter 9. For polytomous items, a standardized mean difference ratio of .25 or greater (coupled with a significant Mantel statistic) was considered a strong indication of DIF. It can be shown that standardized mean difference ratios of .25 are at least as extreme as Mantel-Haenszel statistics corresponding to "C" items (see Chapter 9 for details).

Table 13-14
DIF Category by Grade for Polytomous Items

Grade	DIF Category[1]	Analysis Male/Female	White/Black	White/Hispanic
4	CC-	5	2	0
	BB-	4	2	1
	AA-	39	39	40
	AA+	29	36	41
	BB+	4	2	1
	CC+	2	2	0
8	CC-	7	0	2
	BB-	7	5	3
	AA-	43	48	54
	AA+	57	57	54
	BB+	3	4	3
	CC+	1	4	2
12	CC-	3	3	2
	BB-	7	2	2
	AA-	40	54	54
	AA+	49	45	45
	BB+	9	5	4
	CC+	3	2	4

[1] Positive values of the index indicate items that are differentially easier for the focal group (female, Black, or Hispanic students) than for the reference groups (male or White students). "A+" or "A-" means no indication of DIF, "B+" means a weak indication of DIF in favor of the focal group, "B-" means a weak indication of DIF in favor of the reference group and "C+" or "C-" means a strong indication of DIF.

Following standard practice at ETS, all items identified as showing DIF were reviewed by a committee of trained test developers and subject-matter specialists. As described in Chapter 9, such committees are charged with making judgments about whether the differential difficulty of an item is *unfairly* related to group membership; that is, whether the item is biased. The committee assembled to review NAEP items that were identified as "C" or "CC" items. The committee included both ETS staff and outside members with expertise in the field. It was the committee's judgment that one of the items for the national data was functioning differentially due to factors irrelevant to test objectives. The item asked the student to list two ways that cold temperatures could cause problems. Although the item appeared to be disadvantaging Hispanic students, the committee concluded that this was probably because a large proportion of Hispanic Americans live in warmer parts of the country, and that anyone without experience of cold weather would be disadvantaged in answering this question. The item was removed from scaling due to this differential item functioning.

13.5 ITEM RESPONSE THEORY (IRT) SCALING

In 1993, the National Assessment Governing Board (NAGB) determined that future NAEP assessments should be developed using within-grade frameworks. Within-grade scaling removes the constraint that the trait being measured is cumulative across the grade levels of the assessment. It also means that there is no need for overlap items across grades. Consistent with this view, NAGB also declared that scaling be performed within-grade. Any items that happened to be the same across grades in the assessment were scaled separately for each grade, thus making it possible for common items to function differently in the separate grades. Therefore, the *Science Framework for the 1996 National Assessment of Educational Progress* (National Assessment Governing Board, 1993) specifies that the 1996 science assessment be developed within-grade. Likewise, all IRT scaling was performed within-grade.

Within each grade, items were grouped into three distinct sets corresponding to the three fields of science: earth, physical, and life. IRT-based scales corresponding to each of the fields of science above were developed using the scaling models described in Chapter 11. The scales summarize student performance across all three item types in the assessment (multiple-choice, short constructed-response, and extended constructed-response).

13.5.1 Item Parameter Estimation

For each fields of science scale, item parameter estimates were obtained by the NAEP BILOG/PARSCALE program, which combines Mislevy and Bock's (1982) BILOG and Muraki and Bock's (1991) PARSCALE computer programs. The program uses marginal estimation procedures to estimate the parameters of the one-, two-, and three-parameter logistic models, and the generalized partial credit model described by Muraki (1992) (see Chapter 11). The calibration was performed using all the available examinees in the reporting group. Student sampling weights were used for the analysis.

As described in Chapter 11, multiple-choice items were dichotomously scored (scored 0,1) and were scaled using the three-parameter logistic model. Omitted responses to multiple-choice items were treated as fractionally correct, with the fraction being set to the reciprocal of the number of response options for an item. All constructed-response items with two categories were dichotomously scored and were scaled using the two-parameter logistic model with the lower asymptote parameter set at 0. Omitted responses to these items were treated as incorrect. For calibration, all items that were not reached were treated as if they were not presented to the examinees. Responses to extended constructed-response items that were off-task were also treated as if they had not been presented.

A key assumption associated with IRT scales is that of conditional independence. Conditional on proficiency, examinee's item responses are assumed to be independent. When sets of items are logically dependent on each other, or are based on a single stimulus, this assumption can be violated to a degree that results in aberrant scaling results. In order to avoid possible problems with inter-item dependencies, a small number of additional cluster items was created by combining examinee responses to sets of related items into a single score for each set. The cluster items, rather than their original constituent items, were used in scaling the 1996 science assessment. Examinees omitting all constituents of the cluster item were placed in the "zero correct" category of the cluster item. Examinees classified as "not reaching" all constituent parts were treated as having not been presented the cluster item. All cluster items were scaled using the generalized partial credit model.

Each of the multi-category constructed response items was also scaled using the generalized partial credit model. These items had two, three, four, or five categories of partial credit. One cluster item had six categories. Scoring levels were labeled as shown in Table 13-15.

Table 13-15
Labels for Score Levels of Polytomous Items

Score	3-Category	4-Category	5-Category	6-Category
5				Complete
4			Complete	Essential
3		Complete	Essential	Adequate
2	Complete	Partially correct	Partially correct	Partially correct
1	Partially correct	Unsatisfactory	Unsatisfactory	Unsatisfactory
0	Wrong, off-task, or omitted	Wrong, off-task, or omitted	Wrong, off-task, or omitted	Wrong, off-task, or omitted

Empirical Bayes modal estimates of all item parameters were obtained from the BILOG/PARSCALE program. Prior distributions were imposed on item parameters with the following starting values: thresholds (normal [0,2]); slopes (log-normal [0,.5]); and asymptotes (two-parameter beta with parameter values determined as functions of the number of response options for an item and a weight factor of 50). The locations (but not the dispersions) of the item parameter prior distributions were updated at each program estimation cycle in accordance with provisional estimates of the item parameters.

Starting values were computed from item statistics. Item parameter estimation proceeded in two phases. First, the subject ability distribution was assumed fixed (normal [0,1]) and a stable solution was obtained. The parameter estimates from this solution were then used as starting values for a subsequent set of runs in which the subject ability distribution was freed and estimated concurrently with item parameter estimates. After each estimation cycle, the subject ability distribution was restandardized to have a mean of zero and standard deviation of one. Correspondingly, parameter estimates for that cycle were also linearly restandardized.

13.5.2 Evaluation of Model Fit

During and subsequent to item parameter estimation, an evaluation of the fit of the IRT models was carried out for each of the items in the item pool. These evaluations were conducted to determine the final composition of the item pool making up the scales by identifying misfitting items that should not be included. Evaluations of model fit were based primarily on graphical analyses. For dichotomously-scored multiple-choice and two-category response items, model fit was evaluated by examining plots of estimates of the expected conditional (on θ) probability of a correct response that do not assume a two-parameter or three-parameter logistic model versus the probability predicted by the estimated item characteristic curve (see Mislevy & Sheehan, 1987, p. 302). For the cluster items and multiple-category constructed-response items, similar plots were produced for each item category characteristic curve (see Chapter 9).

As with most procedures that involve evaluating plots of data versus model predictions, a certain degree of subjectivity is involved in determining the degree of fit necessary to justify use of the model. There are a number of reasons why evaluation of model fit relied primarily on analyses of plots rather than seemingly more objective procedures based on goodness-of-fit indices such as the "pseudo chi-squares" produced in BILOG (Mislevy & Bock, 1982). First, the exact sampling distributions of these indices when the model fits are not well understood, even for fairly long tests. Mislevy and Stocking (1987) point out that the usefulness of these indices appears particularly limited in situations like NAEP where examinees have been administered relatively short tests. A study by Stone, Mislevy, and Mazzeo (1994) using simulated data suggests that the correct reference chi-square distributions for these indices have considerably fewer degrees of freedom than the value indicated by the BILOG/PARSCALE program and require additional adjustments of scale. However, it is not yet clear how to estimate the correct number of degrees of freedom and necessary scale factor adjustment factors. Consequently, pseudo chi-square goodness-of-fit indices are used only as rough guides in interpreting the severity of model departures.

Second, as discussed in Chapter 9, it is almost certainly the case that, for most items, item-response models hold only to a certain degree of approximation. Given the large samples sizes used in NAEP, there will be sets of items for which one is almost certain to reject the hypothesis that the model fits the data (since the likelihood of rejecting the null increases with sample size) even though departures are minimal in nature or involve kinds of misfit unlikely to impact on important model-based inferences about student achievement. In practice, it is always wise to temper statistical decisions with judgments about the severity of model misfit and the potential impact of such misfit on final results.

In making decisions about excluding items from the final scales, a balance was sought between being too stringent, hence deleting too many items and possibly damaging the content representativeness of the pool of scaled items, and too lenient, hence including items with model fit poor enough to invalidate the types of inferences made from NAEP results. Items that clearly did not fit the model were not included; however, a certain degree of misfit was tolerated for a number of items included in the final scales.

For the large majority of the items, the fit of the model was extremely good. Figure 13-1 provides a typical example of what the plots look like for a dichotomously-scored item in this class of items. The plot that is shown is for an item from the physical science scale. In the plot, the y-axis indicates the probability of a correct response and the x-axis indicates scale score level (θ). The crosses show estimates of the conditional (on θ) probability of a correct response that do not assume a logistic form (referred to subsequently as nonlogistic-based estimates). The sizes of the crosses are proportional to the estimated density of the theta distribution at the indicated value. The solid curve shows the estimated theoretical item response function. The item response function provides estimates of the conditional probability of a correct response based on an assumed logistic form. The vertical dashed line indicates the estimated location parameter (b) for the item and the horizontal dashed line indicates the estimated lower asymptote (c). Also shown in the plot are the actual values of the item parameter estimates (lower right-hand corner). As is evident from the plot, the 'empirical' or non-logistic-based item trace is in extremely close agreement with the model-based item response function logistic curve.

Figure 13-2 provides an example of a plot for a 4-category extended constructed-response item exhibiting good model fit. Like the plots for the dichotomously-scored multiple-choice items, this plot shows two estimates of each item category characteristic curve, one set that does not assume the partial credit model (the empirical trace shown as asterisks) and one that does (the theoretical trace shown as solid curves). The estimates for all parameters for the item in question are also indicated on the plot. As with Figure 13-1, the two sets of estimates agree quite well, although there is a slight tendency for the nonlogistic-based estimates for category two to be somewhat higher than the model-based estimates for theta values less than 1. An aspect of Figure 13-2 worth noting is the large proportion of examinees that responded in the two lowest response categories for this item[3]. Such results were typical for the extended constructed-response items. Substantial proportions of examinees were either unable or unwilling to provide even minimally adequate answers to such items.

As discussed above, some of the items retained for the final scales display some degree of model misfit. Figures 13-3 (a dichotomously-scored multiple-choice item) and 13-4 (an extended constructed-response item) provide typical examples of such items. Note that in Figure 13-4, the empirical curve lies above the theoretical curve in the lower part of the ability scale for the lowest category, but below the theoretical curve for the next higher category. Combining these two categories would have improved the model fit, but it was judged that the misfit was not sufficiently pronounced in this case to warrant such collapsing. In general, good agreement between empirical and theoretical item traces were found for the regions of the theta scale that includes most of the examinees. Misfit was confined to conditional probabilities associated with theta values in the tails of the subject ability distributions.

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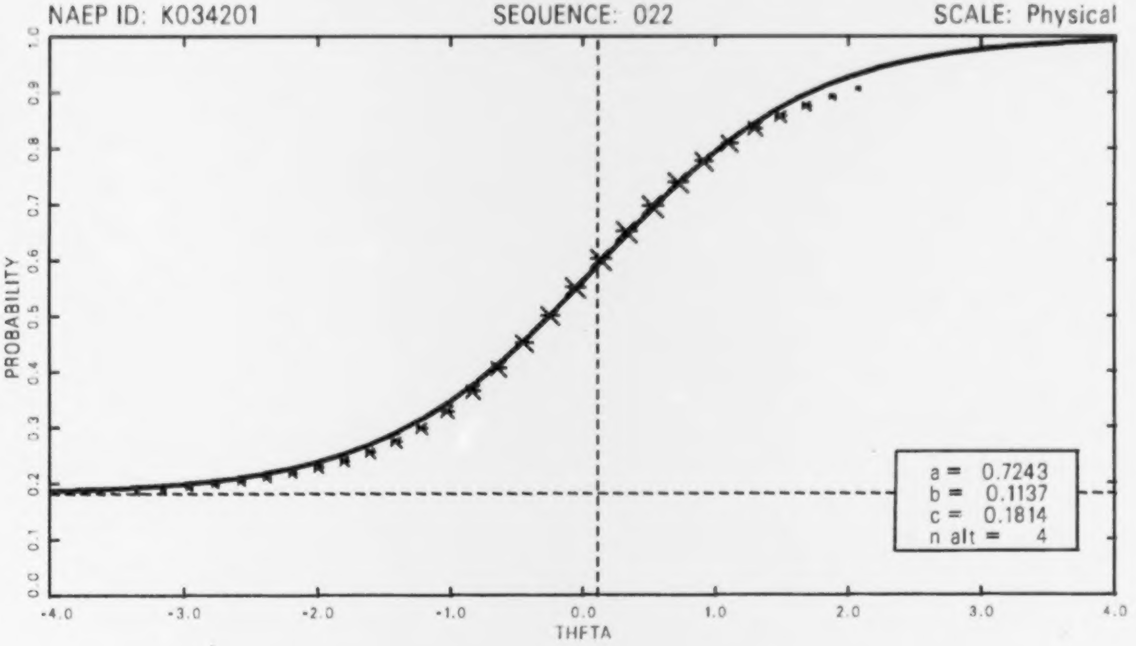
[3] This is evidenced by the relatively large size of the asterisks indicating estimated conditional probabilities for these two categories.

Item K049907 (grade 12, earth science scale) did not fit in a run with and unconstrained (to normal) prior and with all the adjustments that had been made in the national scaling (Figure 13-5). Categories 1 and 2 were combined to yield a 0-1 dichotomous item, and the fit improved substantially (Figure 13-6).

Figure 13-1

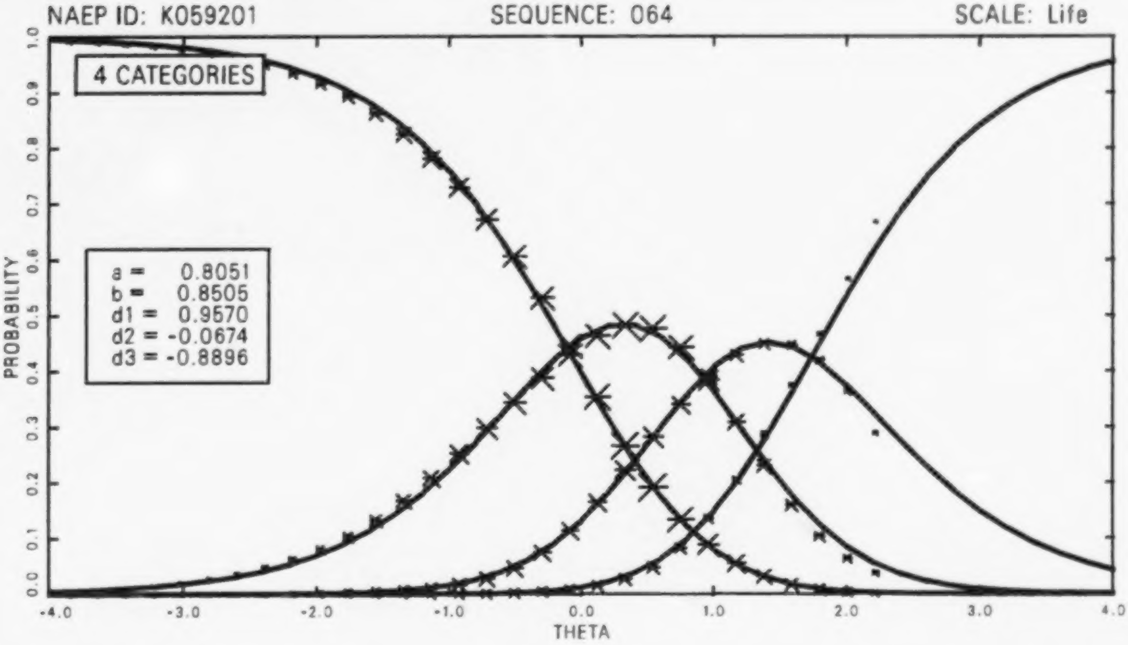
Plot Comparing Empirical and Model-Based Estimates of Item Response Functions for Binary Scored (Multiple-Choice) Items Exhibiting Good Model Fit*



*Asterisks indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 13-2

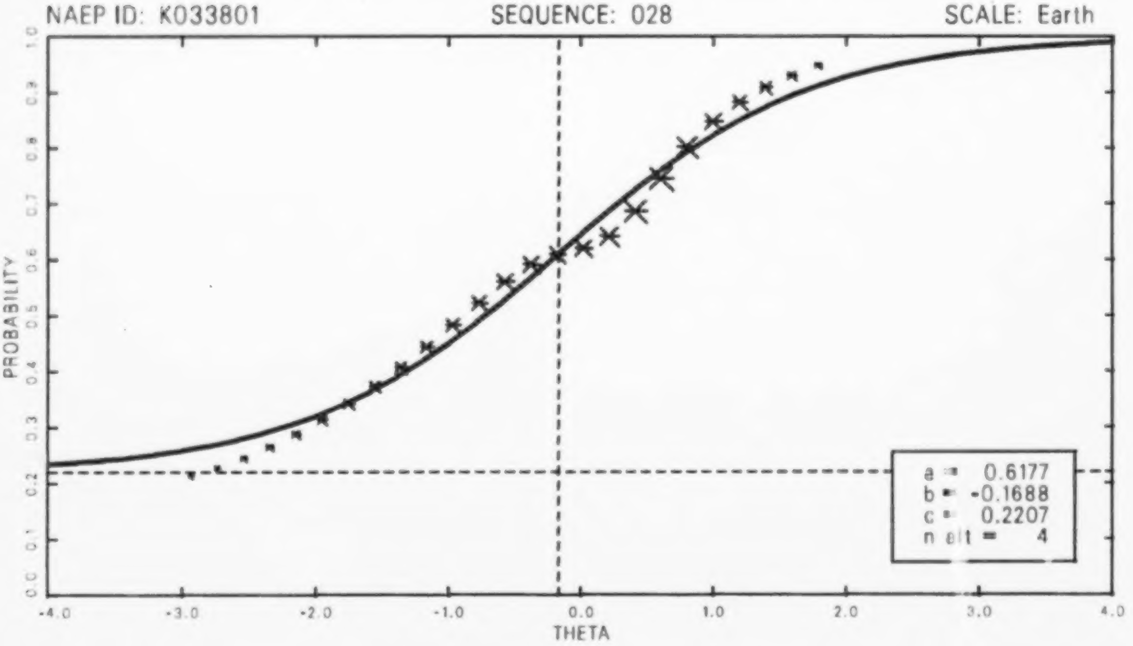
Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for a Polytomously Scored Item Exhibiting Good Model Fit*



*Asterisks indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curve indicates estimated item response function assuming a model-based form.

Figure 13-3

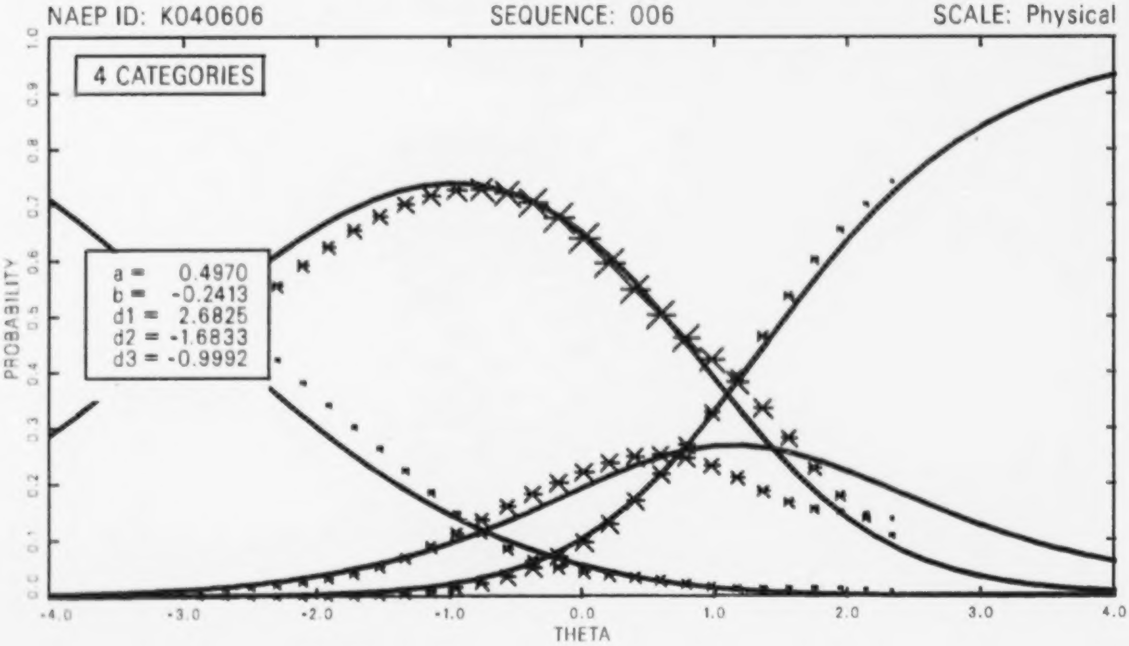
Plot Comparing Empirical and Model-Based Estimates of Item Response Functions for Binary-Scored (Multiple-Choice) Item Exhibiting Some Model Misfit*



*Asterisks indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Figure 13-4

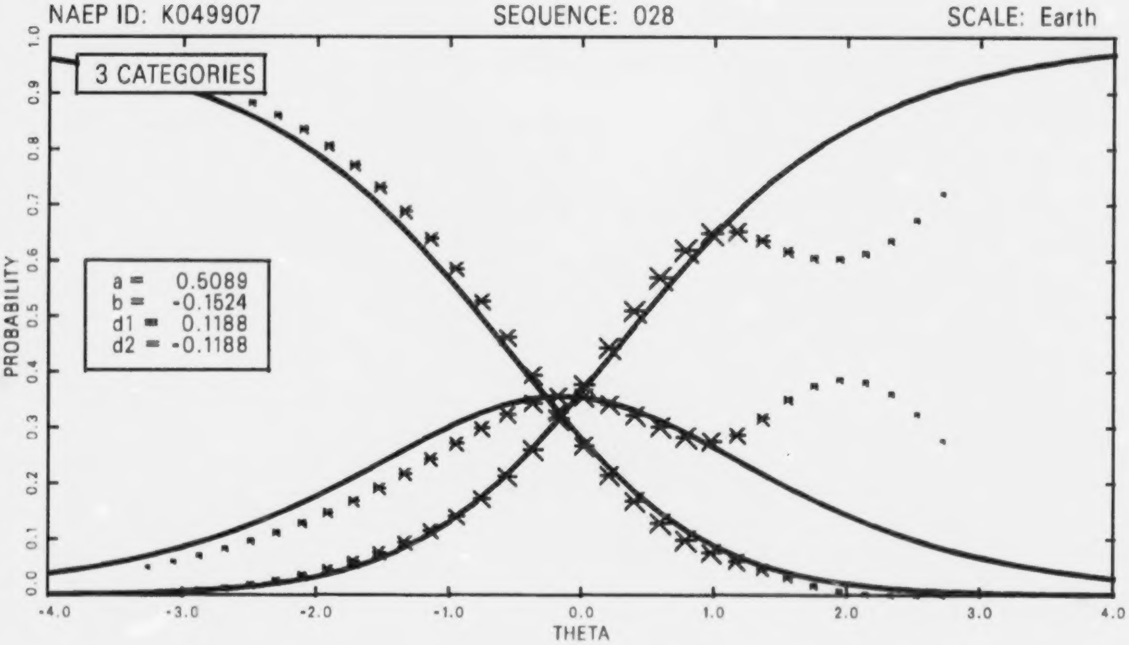
Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for a Polytomously Scored Item Exhibiting Some Model Misfit*



*Asterisks indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curve indicates estimated item response function assuming a model-based form.

Figure 13-5

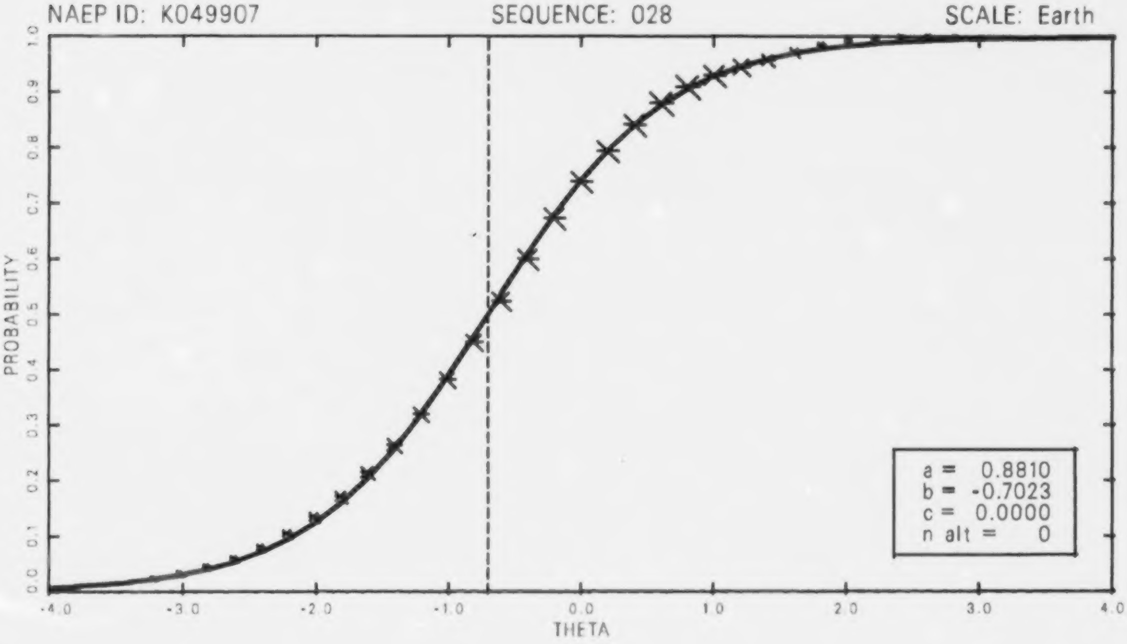
Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for a Polytomously Scored Item (K044101) Exhibiting Poor Model Fit*



*Asterisks indicate estimated conditional probabilities obtained without assuming a model-based form; the solid curve indicates estimated item response function assuming a model-based form.

Figure 13-6

Plot Comparing Empirical and Model-Based Estimates of Item Category Characteristic Curves for Polytomously Scored Item (K044101) After Collapsing Categories 2 and 3*



*Asterisks indicate estimated conditional probabilities obtained without assuming a logistic form; the solid curve indicates estimated item response function assuming a logistic form.

Note: When the number of alternatives of a constructed-response item equaled zero, the item was scored in only two categories.

On the following pages, Table 13-16 lists the items that received special treatment during the scaling process. Included in the table are the block locations and item numbers for the items that were combined into cluster items as well as for those that were excluded from the final scales. At grade 8, all items received identical special treatment in the development of the 1996 State Assessment scales. No other items in either assessment received special treatment. The IRT parameters for the items included in the science assessment are listed in Appendix D.

Table 13-16

Items from the 1996 Science Assessment Receiving Special Attention

Grade	NAEP ID	Block/Item Number	Field of Science	Disposition	Reason
4	K031105	S4 - 5	Physical science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
4	K031107	S4 - 7	Physical science	Collapsed categories: 0,1,2,3 becomes 0,0,1,2	Lack of Fit
4	K031203	S5 - 3	Physical science	Dropped	Dependency
4, 8	K031301	S6 - 6	Physical science	Dropped	Dependency
4	K034802	S13 - 2	Physical science	Collapsed categories 0,1,2 become 0,0,1	Lack of Fit
4	K031402	S7 - 2	Earth science	Collapsed categories : 0,1,2 become 0,0,1	Lack of Fit
4	K031404	S7 - 4	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
4	K031407	S7 - 7	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
4	K034501	S12 - 10	Earth science	Collapsed categories: 0,1,2,3 become 0,1,2,2	Zero Frequency
4	K040501	S21 - 11	Earth science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
4	K031001	S3 - 1	Life science	Dropped to form cluster item	Dependency
4	K031002	S3 - 2	Life science	Dropped to form cluster item	Dependency
4	K031605	S9 - 5	Life science	Dropped	Lack of Fit
4	K031607	S9 - 9	Life science	Collapsed categories 0,1,2,3 become 0,1,2,2	Lack of Fit
4	K032501	S10 - 9A	Life science	Dropped to form cluster item	Dependency
4	K032502	S10 - 9G	Life science	Dropped to form cluster item	Dependency
4	K033501	S11 - 9	Life science	Collapsed categories 0,1,2 become 0,0,1	Lack of Fit

(continued)

Table 13-16 (continued)

Items from the 1996 Science Assessment Receiving Special Attention

Grade	NAEP ID	Block/Item Number	Field of Science	Disposition	Reason
4	KZ34101	S12 - 6	Earth Science	Dropped	—[1]
4	KZ34401	S12 - 9	Earth Science	Dropped	—[1]
4	KZ34501	S12 - 10	Earth Science	Dropped	—[1]
4	KZ34502	S12 - 11	Earth Science	Dropped	—[1]
8	K040601	S3 - 1	Physical science	Collapsed categories 0,1,2 become 0,0,1	Lack of Fit
8	K040702	S4 - 3	Physical science	Collapsed categories: 0,1,2,3 become 0,1,1,2	Lack of Fit
8	K040705	S4 - 4	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Zero Frequency
8	K031306	S6 - 9	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Zero Frequency
8	K043603	S11 - 16	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Zero Frequency
8	K040711	S4 - 12	Earth science	Dropped to form cluster item	Dependency
8	K040712	S4 - 13	Earth science	Dropped to form cluster item	Dependency
8	K040803	S5 - 2	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
8	K040901	S7 - 1	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
8	K040905	S7 - 5	Earth science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
8, 12	K049403	S13 - 15	Earth science	Dropped to form cluster item	Dependency
8, 12	K049404	S13 - 16	Earth science	Dropped to form cluster item	Dependency

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[1] This item was deleted due to an error discovered after scaling was completed.

(continued)

Table 13-16 (continued)

Items from the 1996 Science Assessment Receiving Special Attention

Grade	NAEP ID	Block/Item Number	Field of Science	Disposition	Reason
8	K044101	S20 - 5	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
8	K044401	S20 - 8	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
8	K041306	S8 - 6	Life science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
8	K031603	S9 - 3	Life science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
8	K031611	S9 - 11	Life science	Collapsed categories: 0,1,2 become 0,1,1	Zero Frequency
8	K042602	S10 - 15	Life science	Collapsed categories: 0,1,2,3 become 0,1,1,2	Lack of Fit
8	K049301	S13 - 12	Life science	Collapsed categories: 0,1,2 become 0,1,1	Zero Frequency
8	K037001	S15 - 1	Life science	Dropped	Lack of Fit
12	K041306	S8 - 6	Life science	Dropped	Lack of Fit
12	K049502	S3 - 4	Physical science	Collapsed categories: 0,1,2,3,4 become 0,0,1,2,3	Lack of Fit
12	K049503	S3 - 5	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049602	S4 - 2	Physical science	Collapsed categories: 0,1,2,3,4 become 0,0,1,2,2	Lack of Fit
12	K049603	S4 - 3	Physical science	Collapsed categories: 0,1,2,3,4 become 0,1,2,3,3	Lack of Fit
12	K049702	S6 - 2	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049703	S6 - 4	Physical science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
12	K049706	S6 - 7	Physical science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K058201	S20 - 1	Physical science	Dropped	DIF

(continued)

Table 13-16 (continued)
Items from the 1996 Science Assessment Receiving Special Attention

Grade	NAEP ID	Block/Item Number	Field of Science	Disposition	Reason
12	K040801	S5 - 0	Earth science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
12	K049804	S7 - 4	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049810	S7 - 10	Earth science	Collapsed categories: 0,1,2,3 become 0,1,2,2	Lack of Fit
12	K089811	S7 - 11	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049812	S7 - 12	Earth science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
12	K049903	S9 - 3	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049904	S9 - 4	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K049907	S9 - 7	Earth science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K057201	S20 - 2	Earth science	Dropped	Lack of Fit
12	K049506	S3 - 6	Life science	Collapsed categories: 0,1,2,3 become 0,1,2,2	Zero Frequency
12	K041401	S8 - 8	Life science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit
12	K041404	S8 - 11	Life science	Collapsed categories: 0,1,2 become 0,1,1	Lack of Fit
12	K053601	S14 - 13	Life science	Collapsed categories: 0,1,2,3,4 become 0,1,2,3,3	Lack of Fit
12	K054006	S15 - 6	Life science	Collapsed categories: 0,1,2 become 0,0,1	Lack of Fit

13.6 GENERATION OF PLAUSIBLE VALUES

13.6.1 Principal Components (NSWEEP Program)

Multivariate plausible values were generated for the entire age/grade sample using the multivariate conditioning program CGROUP as revised by Thomas (1994). This procedure employed student weights. Prior to 1990, selected background variables were used for conditioning. However, from 1990 to the present, principal components of the background variables have been used as conditioning variables. Almost all of the background variables were coded as 0-1 contrasts, so no standardization took place. Principal components of these contrasts were employed to remedy problems of extreme collinearity among some of the original conditioning variables. The principal components used accounted for at least 90 percent of the variance of the original conditioning variables.

Results from research on the 1990 Trial State Assessment in mathematics suggests that using a large subset of principal components will yield estimates that differ only slightly from those obtained using the full set (Mazzeo, Johnson, Bowker, & Fong, 1994). Table 13-17 contains a list of the number of principal components included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each grade.

Table 13-17
Proportion of Proficiency Variance Accounted for by the Conditioning Model for the Science Main Assessment

Grade	Number of Conditioning Contrasts[1]	Number of Principal Components[1]	Proportion of Proficiency Variance Physical Science	Earth Science	Life Science
4	948	317	.64	.57	.59
8	1,041	326	.63	.63	.64
12	808	290	.71	.71	.70

[1] Excluding the constant term

13.6.2 Conditioning (CGROUP Program)

The codings of the original science-specific conditioning variables, before principal components were calculated, are presented in Appendix C. NAEP-CGROUP (described in Chapter 11) creates posterior distributions of proficiencies by combining information from item responses of individuals and information from linear regression of proficiency on conditioning variables. For each individual, five plausible values are randomly drawn from their posterior proficiency distribution.

The values of the conditioning effects are expressed in the metrics of the original calibration scale. Definitions of derived conditioning variables are given in Appendix B.

13.6.3 Analysis of Dimensionality

As mentioned earlier, the main assessment is multivariate with three content area scales. Tables 13-18 and 13-19 give conditional and marginal correlations for the three scales for the three grades. The conditional correlations can be thought of as correlations from information pooled within the demographic subgroups corresponding to grouping variables used to condition the data with CGROUP. The conditional correlations correspond to the error correlations of a CGROUP analysis. The conditional correlations are high, averaging .79 for grade 4, .90 for grade 8, and .83 for grade 12. The marginal correlations are the average of the scale correlations over five plausible values generated by CGROUP. Since these correlations are not pooled within background groupings, marginal correlations tend to be larger than conditional correlations, averaging .84 for grade 4, .91 for grade 8, and .90 for grade 12. Although it is of substantive interest to analyze the scales separately, the correlations indicate that they are highly redundant with each other.

Table 13-18

Conditional Correlations from Conditioning (CGROUP)

Grade	Field of Science Scale	Physical Science	Earth Science	Life Science
4	Physical Science	1.00	—	—
	Earth Science	0.79	1.00	—
	Life Science	0.79	0.78	1.00
8	Physical Science	1.00	—	—
	Earth Science	0.92	1.00	—
	Life Science	0.89	0.88	1.00
12	Physical Science	1.00	—	—
	Earth Science	0.87	1.00	—
	Life Science	0.82	0.80	1.00

Table 13-19

Marginal Correlations of Science Scales[1]

Grade	Field of Science Scale	Physical Science	Earth Science	Life Science
4	Physical Science	1.00	—	—
	Earth Science	0.84	1.00	—
	Life Science	0.84	0.84	1.00
8	Physical Science	1.00	—	—
	Earth Science	0.93	1.00	—
	Life Science	0.91	0.90	1.00
12	Physical Science	1.00	—	—
	Earth Science	0.92	1.00	—
	Life Science	0.90	0.89	1.00

[1] Tabled values were obtained by computing a separate Pearson correlation coefficient for each plausible value, computing Fisher's z-transformation for each value, computing the average of the transformed values, and computing the inverse transformation of the average.

13.7 THE FINAL PROFICIENCY SCALES

13.7.1 Field of Science Scales

Like all IRT scales, the field of science scales have a linear indeterminacy that may be resolved by an arbitrary choice of origin and unit-size for each scale. The 1996 science assessment was developed using a new framework. Because it was not appropriate to compare results from the 1996 assessment with those of previous NAEP science assessments, no attempt was made to link or align scores on the new assessment to those of previous assessments. Therefore, it was necessary to establish a new scale for reporting. NAEP assessments developed earlier (such as the 1992 reading assessment) were developed with a cross-grade framework, in which the trait being measured is conceptualized as cumulative across the grades of the assessment. Accordingly, a single 0-to-500 scale was established for all three grades in each of these assessments.

In 1993, the National Assessment Governing Board (NAGB) determined that future NAEP assessments should be developed using within-grade frameworks. This removes,the constraint that the trait being measured is cumulative. It also means that there is no need for overlap items across grades. Consistent with this view, NAGB also declared that scaling be performed within-grade. Any items that happened to be the same across grades in the assessment were scaled separately for each grade, thus making it possible for common items to function differently in the separate grades. The NAEP 1994 U.S. history and geography assessments were developed and scaled within-grade. After scaling, the scales were aligned so that grade 8 had a higher mean than grade 4, and grade 12 had a higher mean than grade 8. The results were reported on a final 0-to-500 scale that looked similar to those used in reading, in spite of the differences in development and scaling. This choice of the reporting scale was the source of potential confusion and misinterpretation.

Therefore, for the NAEP 1996 science assessment—which was also developed and scaled using within-grade procedures—a new reporting metric was adopted. The results are reported on 0-to-300 scales and the means for each of the grades are identical. For each grade, the mean for each field of science was set at 150 and the standard deviation was 35. Constraining the mean and standard deviation of the scales to 150 and 35 also constrained, to some degree, the percentiles for the total group of students at each grade. However, within-grade comparisons of percentiles across subgroups can still provide valuable comparative information. The reporting metric was developed using data from the national assessment program, and the results for the state assessment program were linked to these scales.

For each field of science, the scale mean and standard deviation were set to 150.0 and 35.0 using the transformation:

$$\theta_{target} = A \bullet \theta_{calibrated} + B.$$

where θ_{target} denotes values on the final transformed scale and $\theta_{calibrated}$ denotes values on the original calibration scale from BILOG/PARSCALE. The calculation of the value of "A" and "B" is described in Chapter 9, Section 9.3.5. The constants for the linear transformation for each scale are given in Table 13-20.

Table 13-20

Coefficients of Linear Transformations of the Fields of Science Scales from the Calibrating Scale Units to the Units of Reporting Proficiency

Grade	Field of Science Scale	A	B
4	Physical Science	34.91	151.17
	Earth Science	34.09	150.67
	Life Science	35.09	150.51
8	Physical Science	35.85	150.23
	Earth Science	34.56	150.58
	Life Science	35.64	150.25
12	Physical Science	37.76	149.65
	Earth Science	36.59	149.77
	Life Science	35.91	150.19

13.7.2 The Composite Science Proficiency Scale

In addition to the plausible values for each scale, a composite of the three fields of science scales was created as a measure of overall science performance. The composite was a weighted average of plausible values on the fields of science scales (earth, physical, and life). The weights for the scales were proportional to the importance assigned to each field of science contained in the assessment specifications given in the *Science Framework*. The weights are given in Table 13-21. As indicated in Table 2-4 of Chapter 2, the weights for each of the fields of science are similar to the actual proportion of assessment time devoted to that field. In developing the composite scale, the weights were applied to the plausible values for each fields of science as expressed in terms of the final scale (i.e., after transformation from the provisional BILOG/PARSCALE scales).

Table 13-21

Weights Used for Each Field of Science Scale to Form the Science Composite

Field of Science Scale	Grade 4	Grade 8	Grade 12
Physical science	.33	.30	.33
Earth science	.33	.30	.33
Life science	.33	.40	.33

Finally, it is necessary to caution that, although the science composite is expressed in units that seem somewhat similar to the long-term trend science scale, it is not appropriate to compare scores. The transformation chosen to resolve the linear indeterminacy in the science composite is a convenient transformation, but it is only one of a conceptually infinite number of such transformations that could have been chosen. Any one of these transformations would have provided equivalent information about the relative standings of subgroups in the population. *Because there is no link, real or implied, in the construction of the science composite and the field of science scales to either the mathematics assessment or to the previous science assessments, the comparison of students' science proficiencies to students' proficiencies in other subject areas is devoid of meaning.*

13.8 PARTITIONING OF THE ESTIMATION ERROR VARIANCE

For each grade, the error variance of the final, transformed scale mean was partitioned as described in Chapter 11. This analysis yielded estimates of the proportion of error variance due to sampling students and the proportion due to the latent nature of θ. These estimates are given in Table 13-22 for each field of science scale and the composite scale (for stability, the estimates of the between-imputation variance, *B*, in Equation 11.9). Additional results, including those by gender and race/ethnicity, are presented in Appendix E.

Table 13-22

Estimation Error Variance and Related Coefficients for the Science Main Assessment

Grade	Field of Science Scale	Total Estimation Error Variance	Proportion of Variance Due to . . . Student Sampling	Latency of θ
4	Physical Science	1.16	0.82	0.18
	Earth Science	0.72	0.85	0.15
	Life Science	0.86	0.78	0.22
	Composite	0.64	0.89	0.11
8	Physical Science	0.91	0.92	0.08
	Earth Science	0.89	0.91	0.09
	Life Science	1.07	0.86	0.14
	Composite	0.78	0.94	0.06
12	Physical Science	1.03	0.92	0.08
	Earth Science	0.91	0.94	0.06
	Life Science	0.80	0.89	0.11
	Composite	0.76	0.96	0.04

13.9 SCIENCE TEACHER QUESTIONNAIRES

Teachers of fourth- and eighth-grade students were surveyed about their educational background and teaching practices. The students in a particular classroom had their records matched with their teacher's survey information. Variables derived from the questionnaire were used in the conditioning models, along with a variable that indicated whether a student record had been matched with a teacher record, which controls estimates of subgroup means for differences that exist between the matching and non-matching students. Of the 7,305 fourth-grade students in the sample, 89.0 percent were matched with both parts of the teacher questionnaire and 2.2 percent were matched with only the first, teacher background, part of the questionnaire. For the eighth-grade students sample, 82.4 percent were matched with both parts of the teacher questionnaire and 1.4 percent were matched with only the first part of the questionnaire. The lower match rate for both parts of the questionnaire for eighth-grade students was due in part to the fact that in grade 8 students were matched to the particular class that the teacher taught. Class membership information was often missing or ambiguous. For grade 4, students only had to be matched to the teacher, resulting in higher match rates. Thus, 91.4 percent of the fourth graders and 83.8 percent of the eighth graders were matched with at least the background information about their science teachers.

13.10 THE WEIGHT FILES

Westat produced the final student and school weights and the corresponding replicate weights for the 1996 science assessment. Information for the creation of the weight files was supplied by NCS under the direction of ETS.

As was described in the *Technical Report of the 1996 State Assessment Program in Science* (Allen, Swinton, Isham, & Zelenak, 1998), the State Assessment sample was split into two subsamples, one using the 1992 inclusion rules (S1) and one using the 1996 inclusion rules (S2) the weighting process was more complex than in previous assessments (see Allen, Swinton, Isham, & Zelenak, 1998 for more details).

In the national science assessment, only the 1996 inclusion rules (S2) were used. Also, there were no accommodations offered for students with disabilities or for students with limited English proficiency in the national science assessment. Thus, a single sample was used for both analysis and reporting, and only a single set of student sampling weights. The student sampling weights have replicate weights associated with them. Replicate weights are used to estimate jackknife standard errors for each statistic estimated for the national science assessment.

Chapter 14

DATA ANALYSIS FOR THE LONG-TERM TREND READING ASSESSMENT[1]

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14.1 INTRODUCTION

This chapter describes the analyses performed on the responses to the cognitive and background items in the 1996 long-term trend reading assessment. These analyses led to the results presented in the *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997). The emphasis of this chapter is on the methods and results of procedures used to develop the IRT-based scale scores that formed the basis of this report. The theoretical underpinnings of the IRT and plausible values methodology described in this chapter are given in Chapter 11, and several of the statistics are described in Chapter 9.

The objectives of the reading long-term trend analysis were to prepare scale values and perform all analyses necessary to produce a long-term trend report in reading. The reading long-term trend results include the years 1971, 1975, 1980, 1984, 1988, 1990, 1992, 1994, and 1996. The major analysis components are discussed in turn. Some aspects of the analysis, such as procedures for item analysis, scoring of constructed-response items, and methods of scaling, are described in previous chapters and are therefore not detailed here.

The student samples that were administered reading items in the 1996 long-term trend reading assessment are shown in Table 14-1. See Chapters 1 and 3 for descriptions of the target populations and the sample design used for the assessment.

The long-term trend results reported in *Trends in Academic Progress* are based on print administrations and occur at all of the age levels. The samples involved in the analysis are shown in Table 14-1 as 9[RW-LTTrend], 13[RW-LTTrend], and 17[RW-LTTrend]. The long-term trend booklets for these samples contained blocks of reading and writing items administered in print form. All students received a block of common background questions, distinct for each age, and subject-area background questions that were presented in the cognitive blocks. The booklets are identical to those used for long-term trend assessments in 1984, 1988, 1990, 1992, and 1994. The booklets and the blocks within those booklets are listed in Chapter 4. Additional information about all of the items in these blocks also appears in that chapter. This chapter includes specific information about the long-term trend items that were scaled. Both age- and grade-selected students contributed to the long-term trend scaling. However, only students in the "age-only" portion of the reading long-term trend samples contributed to the results presented in *Trends in Academic Progress*.

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[1] Jo-Lin Liang was the primary person responsible for the planning, specification, and coordination of the reading long-term trend analyses, advised by Eiji Muraki, and Nancy L. Allen. Data analyses and scaling were performed by Lois H. Worthington, advised by David S. Freund. Others contributing to the analysis of data were Bruce A. Kaplan, and Norma A. Norris. John R. Donoghue provided consultation.

Table 14-1

NAEP 1996 Long-Term Trend Reading Student Samples

Sample	Booklet IDs	Mode	Cohort Assessed	Time of Testing	Age Definition	Modal Grade	Number Assessed
9 [RW-LTTrend]	51-56	Print	Age 9/Grade 4	1/3/96 - 3/8/96 (Winter)	CY	4	5,019
13 [RW-LTTrend]	51-56	Print	Age 13/Grade 8	10/9/95 - 12/22/95 (Fall)	CY	8	5,493
17 [RW-LTTrend]	51-56	Print	Age 17/Grade 11	3/11/96 - 5/10/96 (Spring)	Not CY	11	4,669

LEGEND

RW	Reading and writing
LTTrend	Long-term trend assessment
Print	Print administration
CY	Calendar year: birthdates in 1986, and 1982 for ages 9, and 13
Not CY	Age 17 only: birthdates between October 1, 1978, and September 30, 1979

Table 14-2 clarifies the relationships between the 1996 long-term trend samples and samples from previous years. For ages 9, 13, and 17, the [RW-LTTrend] samples allow direct comparisons with 1994, 1992, 1990, 1988, and 1984 samples. The long-term trend scale, established in 1984, was linked to the 1971, 1975, and 1980 assessments using a complex equating strategy described in *Implementing the New Design: The NAEP 1983-84 Technical Report* (Beaton, 1987). At each age, several intact booklets were retained from the 1984 assessment, forming the basis of the reading long-term trend assessment in 1988, 1990, 1992, 1994, and 1996. Information about the 1988 assessment is available in *Focusing the New Design: The NAEP 1988 Technical Report* (Johnson & Zwick, 1990); information about the 1990 assessment is given in *The NAEP 1990 Technical Report* (Johnson & Allen, 1992); information about the 1992 assessment is given in *The NAEP 1992 Technical Report* (Johnson & Carlson, 1994); and information about the 1994 assessment is given in *The NAEP 1994 Technical Report* (Allen, Kline, & Zelenak, 1996).

The 1996 long-term trend included, at each age level, six of the assessment booklets administered in 1984. These booklets (51-56) contained both reading and writing blocks, as well as background items. Although these long-term trend booklets represented only about one-tenth of the reading booklets administered in the complex 1984 BIB design,[2] they contained 10 of the 12 reading blocks that were scaled at each age/grade level in 1984. The samples of students who received these long-term trend booklets are described in Table 14-1 and in Chapter 3. The purpose of the reading long-term trend analysis was to add to the reading trend results that extended from 1971 to 1994 for ages 9, 13, and 17. The numbers of scaled items for each age are presented in Table 14-3. Each age was scaled separately. The numbers of items scaled in 1996 that were common across assessment years are given in Table 14-4. As was the case for previous long-term trend analyses, the long-term trend scale is univariate. Dimensionality analyses conducted following the 1984 assessment showed that the reading items were well summarized by a unidimensional scale (Zwick, 1987).

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[2] The long-term trend assessment included 1984 Booklets 16, 17, 27, 34, 55, and 60 at age 9 and Booklets 13, 16, 17, 21, 34, and 57 at ages 13 and 17 (see J. R. Johnson, 1987, pp. 120-121). The 1984 main assessment focused-BIB design included 57 booklets that contained at least one scaled reading block at age 9 and 56 such booklets at ages 13 and 17.

Table 14-2

NAEP Reading Samples Contributing to 1996 Long-Term Trend Results, 1971-1996

Cohort	Year	Sample	Subjects	Time of Testing	Mode of Administration	Age Definition	Modal Grade
Age 9	1971	Main	RL	Winter	Tape	CY	4
	1975	Main	RA	Winter	Tape	CY	4
	1980	Main	RA	Winter	Tape	CY	4
	1984	Main	RW	Winter, Spring	Print	CY	4
	1984	T-84	RW	Winter	Tape	CY	4
	1988	LTTrend[1]	RW	Winter	Print	CY	4
	1990	LTTrend[1]	RW	Winter	Print	CY	4
	1992	LTTrend[1]	RW	Winter	Print	CY	4
	1994	LTTrend[1]	RW	Winter	Print	CY	4
	1996	LTTrend[1]	RW	Winter	Print	CY	4
Age 13	1971	Main	RL	Fall	Tape	CY	8
	1975	Main	RA	Fall	Tape	CY	8
	1980	Main	RA	Fall	Tape	CY	8
	1984	Main	RW	Winter, Spring	Print	CY	8
	1984	T-84	RW	Fall	Tape	CY	8
	1988	LTTrend[1]	RW	Fall	Print	CY	8
	1990	LTTrend[1]	RW	Fall	Print	CY	8
	1992	LTTrend[1]	RW	Fall	Print	CY	8
	1994	LTTrend[1]	RW	Fall	Print	CY	8
	1996	LTTrend[1]	RW	Fall	Print	CY	8
Age 17	1971	Main	RL	Spring	Tape	Not CY	11
	1975	Main	RABS	Spring	Tape	Not CY	11
	1980	Main	RA	Spring	Tape	Not CY	11
	1984	Main	RW	Winter, Spring	Print	Not CY	11
	1984	T-84	RW	Spring	Tape	Not CY	11
	1988	LTTrend[1]	RW	Spring	Print	Not CY	11
	1990	LTTrend[1]	RW	Spring	Print	Not CY	11
	1992	LTTrend[1]	RW	Spring	Print	Not CY	11
	1994	LTTrend[1]	RW	Spring	Print	Not CY	11
	1996	LTTrend[1]	RW	Spring	Print	Not CY	11

[1] **Note:** Within a cohort, these samples received common booklets.

LEGEND

RL	Reading and literature	LTTrend	Long-term trend (these samples received common booklets within an age group)
RA	Reading and art		
RABS	Reading, art, index of basic skills	Print	Print administration
RW	Reading and writing	Tape	Audiotape administration
Main	Main assessment	CY	Calendar year: birthdates (1996 sample) in 1986 and 1982 for ages 9 and 13
T-84	Special sample in the 1984 assessment that was used to establish links to previous assessments (1971-1980) for the purposes of long-term trend	Not CY	Age 17 only (1996 sample): birthdates between October 1 and September 30 of the appropriate years

Table 14-3

Numbers of Scaled Reading Long-Term Trend Items Common Across Ages

Age	Number of Items
9 only	61[1]
13 only	22[1]
17 only	23
9 and 13 only	13
9 and 17 only	2
13 and 17 only	42
9, 13, and 17	26[1]
Total	189[1]

[1] These figures have been updated since their publication in the 1992 and 1994 NAEP technical reports (Table 12-3 and Table 15-3, respectively).

Table 14-4

Numbers of Scaled Reading Long-Term Trend Items Common Across Assessments

	Number of Items		
Assessment Year	Age 9	Age 13	Age 17
1984, 1992, 1994, 1996	102	103	93[1]
1984, 1990, 1992, 1994, 1996	101	101	92[1]
1984, 1988, 1990, 1992, 1994, 1996	98	98	87
1980, 1984, 1988, 1990, 1992, 1994, 1996	67	71	52
1971, 1975, 1980, 1984, 1988, 1990, 1992, 1994, 1996	36	45	37

[1] These figures have been updated since their publication in the NAEP 1992, and 1994 Technical Reports (Table 12-4, and Table 15-4, respectively).

The steps in the reading long-term trend analysis are documented in the following sections. As is usual in NAEP analyses, the first step was to gather item and block information. The trend items were then calibrated according to the IRT model. Plausible values were generated after conditioning on available background variables. Finally, the scale values were placed on the final reading long-term trend scale used in previous trend assessments.

14.2 ITEM ANALYSIS FOR THE READING LONG-TERM TREND ASSESSMENT

Conventional item analyses did not identify any difficulties with the long-term trend data. The results displayed in Table 14-5 contain the number of items, size of the unweighted sample administered the block, average weighted proportion correct, average weighted r-biserial, and average weighted alpha as a measure of reliability for each block. Because the blocks were presented in self-paced, print-administered form, the weighted proportion of students attempting the last item is included in the table to give an indication of the speededness of each block. Common labeling of these blocks across ages does not denote common items. Booklet information is detailed in Chapter 4. Student weights were used for all statistics except for the sample sizes. The average values reflect only the items in the block that were scaled. Overall, the 1996 item-level statistics were not very different from those for the 1994 assessment.

Table 14-5

Descriptive Statistics for Item Blocks in the Reading Long-Term Trend Samples

	Blocks										
Statistics	**B8**	**B10**	**B11**	**B12**	**B13**	**B14**	**B15**	**B16**	**B17**	**B18**	**B22**
Age 9											
Number of scaled items	10	8	11	7	11	12	11	—[1]	11	12	9
Number of scaled constructed-response items	1	0	0	1	1	1	0	—[1]	0	0	3
Unweighted sample size	630	610	610	603	624	624	595	—[1]	603	1222	592
Average weighted proportion correct	.62	.43	.43	.50	.41	.60	.51	—[1]	.56	.47	.60
Average weighted r-biserial	.75	.62	.62	.82	.61	.75	.60	—[1]	.74	.64	.73
Weighted alpha reliability	.75	.67	.71	.76	.71	.84	.64	—[1]	.81	.75	.74
Weighted proportion of students attempting last item	.92	.82	.77	.72	.66	.66	.86	—[1]	.86	.82	.97
Age 13											
Number of scaled items	12	9	8	5	11	12	10	9	16	11	—[2]
Number of scaled constructed-response items	1	0	0	0	1	1	1	1	0	0	—[2]
Unweighted sample size	629	642	630	673	630	615	658	642	673	629	—[2]
Average weighted proportion correct	.64	.59	.63	.64	.58	.66	.66	.73	.59	.67	—[2]
Average weighted r-biserial	.71	.59	.73	.80	.65	.68	.64	.77	.56	.74	—[2]
Weighted alpha reliability	.71	.60	.68	.57	.66	.78	.55	.67	.70	.77	—[2]
Weighted proportion of students attempting last item	.94	.83	.98	.95	.91	.81	.84	.92	.78	.97	—[2]
Age 17											
Number of scaled items	12	4	8	6	11	12	13	10	10	7	—[2]
Number of scaled constructed-response items	1	1	0	1	1	1	1	1	0	0	—[2]
Unweighted sample size	605	638	585	643	585	588	622	638	643	605	—[2]
Average weighted proportion correct	.72	.72	.79	.72	.68	.84	.65	.74	.53	.68	—[2]
Average weighted r-biserial	.75	.78	.83	.81	.76	.78	.62	.71	.63	.79	—[2]
Weighted alpha reliability	.72	.43	.67	.41	.68	.80	.73	.74	.70	.70	—[2]
Weighted proportion of students attempting last item	.95	.97	1.00	.96	.96	.89	.69	.82	.72	.98	—[2]

[1] Block B16 was not administered at age class 9.

[2] Block B22 was not administered at age class 13 or 17.

14.3 TREATMENT OF CONSTRUCTED-RESPONSE ITEMS

Data for constructed-response items in the long-term trend analysis were used for the 1984, 1990, 1992, 1994, and 1996 assessments only. Constructed-response items were not included in the original scoring of the 1988 reading assessment because a previous study (Zwick, 1988) had shown that scoring inconsistencies (drops in interrater reliability and/or scorer drift—that is, scorers showed evidence of rating items more strictly or more leniently than did the original 1984 scorers) had affected these items.

Rater reliability within year was computed for the 1996 constructed-response items at each age. Between year reliability was also studied with the 1994, and the 1984 responses. In general, the 1996 scoring did not show irregularities. All of the 1996 constructed-response items were used in the trend analysis except the items that were excluded from calibration in the previous assessment. The deleted items are listed in Table 14-6. The remaining constructed-response items were dichotomized according to criteria developed by subject-area experts. The dichotomized versions of the constructed-response items were included in the calibration.

Table 14-6

Items Deleted from the Reading Long-Term Trend Analysis

Age	Block	Item	Reason for Exclusion
9	B10	N001801	Excluded in previous assessment
	B13	N003003	Excluded in previous assessment
	B10	N008905	Excluded in previous assessment (constructed-response item)
13	B10	N001801	Excluded in previous assessment
	B10	N001904	Excluded in previous assessment (constructed-response item)
	B11	N002302	Excluded in previous assessment
	B12	N002804	Excluded in previous assessment (constructed-response item)
	B17	N005001	Excluded in previous assessment
17	B10	N001702	Excluded in previous assessment
	B11	N002302	Excluded in previous assessment
	B17	N015905	Excluded in previous assessment (constructed-response item)

14.4 IRT SCALING FOR THE READING LONG-TERM TREND ASSESSMENT

14.4.1 Item Parameter Estimation

The first step in the scaling process was the estimation of item parameters for the long-term trend items. This item calibration was performed using the BILOG/PARSCALE program described in Chapter 11. Items were calibrated separately for each of the three age/grade groups. Item parameters were estimated using combined data from the assessment years 1994 and 1996, treating each assessment as a sample from a separate subpopulation. Student weights were used for the calibration. To ensure that each assessment year had a similar influence on the calibration, student weights for 1994 examinees were multiplied by a constant, to adjust them to have the same sum as the sum of the weights for the 1996 examinees. Approximately 600-700 examinee responses for each item were present in each assessment year.

Starting values for item parameters were based on the final item parameter values from the analysis of the 1994 long-term trend assessment. As described in Chapter 9, BILOG/PARSCALE calibrations were completed in two stages. At stage one, the proficiency distribution of each assessment year was constrained to be normal, although the means and variances differed across assessment years. The values of the item parameters from this normal solution were then used as starting values for a second-stage estimation run in which the proficiency distribution (modeled as a separate multinomial distribution for each assessment year) was estimated concurrently with item parameters. Calibration was concluded when changes in item parameters became negligibly small (i.e., less than .005).

14.4.2 Evaluation of Model Fit

During and subsequent to item parameter estimation, evaluations of the fit of the IRT models were carried out for each of the items. These evaluations were based primarily on graphical analysis. First, model fit was evaluated by examining plots of nonmodel-based estimates of the expected proportion correct (conditional on proficiency) versus the proportion correct predicted by the estimated item response function (see Chapter 9, and Mislevy & Sheehan, 1987, p. 302). In making decisions about excluding items from the final scales, a balance was sought between being too stringent, hence deleting too many items and possibly damaging the content representativeness of the pool of scaled items, and being too lenient, hence including items with model fit poor enough to endanger the types of model-based inferences made from NAEP results. A certain degree of misfit was tolerated for a number of items included in the final scales.

Most of the items fit the model well. Items excluded from the analysis of the 1996 assessment were the same items that were deleted from the 1994 reading long-term trend analysis. Table 14-6 lists items that were excluded from the analysis of the 1996 long-term trend assessment.

The adequacy of the assumption of a common item response function across assessment years was also evaluated by comparing the nonmodel-based expected proportions for each assessment year to the single, model-based item response function fit by BILOG/PARSCALE. Items that showed clear evidence of functioning differently across assessments were treated as separate items for each assessment year--that is, separate item response functions were estimated for each assessment. As was the case with deleting items, in making decisions about scaling items separately by assessment year, a balance was sought between being too stringent, hence splitting too many items and possibly damaging the common item link between the assessment years, and being too lenient, hence including items with model fit poor enough to endanger the model-based trend inferences. These separately scaled items will be reexamined in future long-term trend assessments.

At age 9, one constructed-response item was calibrated separately for each assessment year. Examination of residual plots identified the item as functioning differently across assessments. Figure 14-1 shows item N014502 from the analysis for grade 4/age 9. Data are presented for 1994 (squares), and for 1996 (asterisks)[3]. For middle proficiency values, the two sets of symbols diverge, and the discrepancy of the item characteristic curves of the two years is substantial. The top (1994 data), and the bottom (1996 data) of Figure 14-2 show the plots for the item treated separately by assessment year. The 1996 data showed poorer fit. In order to maintain the link for the trend, this item was kept in the analysis but with the 1994 data calibrated separately and the 1996 data excluded from the final calibration. The remaining misfit is relatively small. Overall, one long-term trend reading item was calibrated separately by assessment year. Table 14-7 lists the item that was calibrated separately across assessment years.

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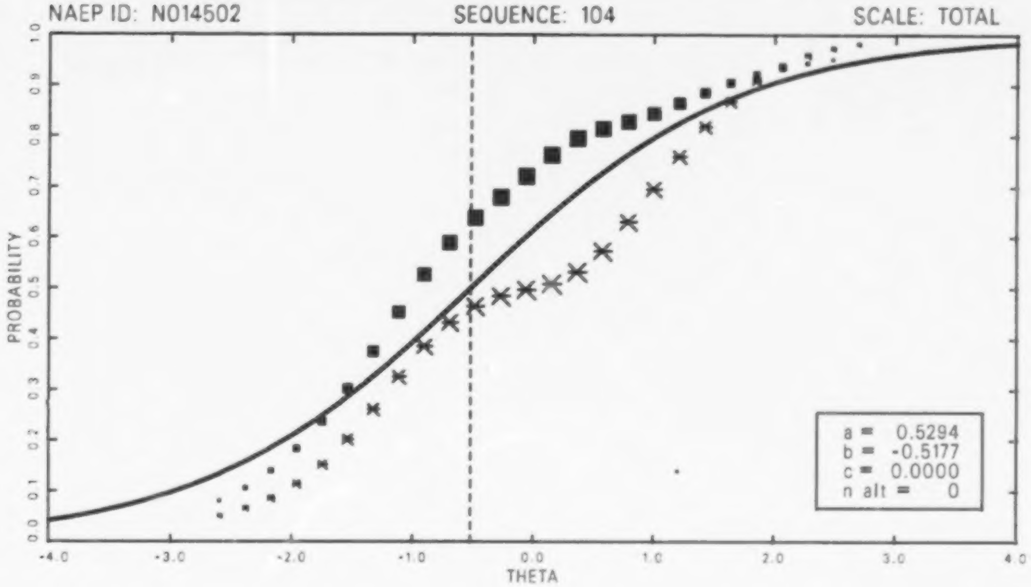
[3] The size of the symbols are proportional to the estimated number of students at a particular scale score level. The symbols are ordinarily larger in the middle of the theta scale, where most students' scale scores fall.

Figure 14-1
Example Long-Term Trend Item (N014502, Age 9)
Demonstrating Differential Item Functioning Across Assessment Years 1994 and 1996[1]

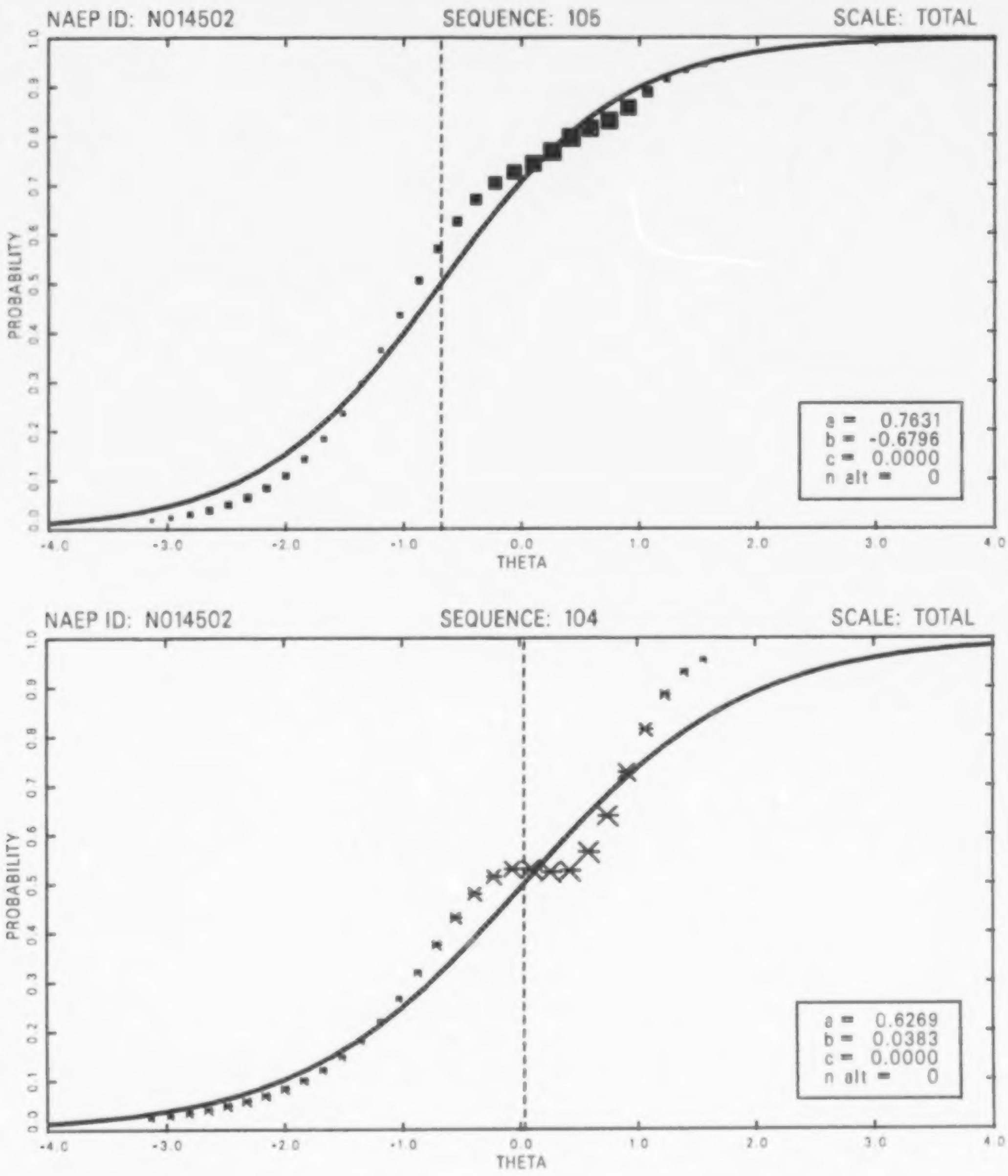


[1] This plot compares empirical and model-based estimates of the item response function (IRF). The smooth curve represents the model-based estimate at each provisional proficiency level. The squares represent 1994 data; asterisks represent 1996 data.

Note: When the number of alternatives of a constructed-response item equaled zero, the item was scored in only two categories.

Figure 14-2

Example Long-Term Trend Item (N014502, Age 9)
Fitting Separate Item Response Functions for Each Assessment Year[1]



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[1] The plot compares empirical and model-based estimates of the item response function (IRF). The smooth curve represents the model-based estimate at each provisional proficiency level. The squares represent 1994 data; asterisks represent 1996 data.

Note: When the number of alternatives of a constructed-response item equaled zero, the item was scored in only two categories.

Table 14-7

Item Calibrated Separately by Assessment Year in the Reading Long-Term Trend Analysis

Age	Block	Item	Reason for Separate Calibration
9	B22	N014502	Poor fit across assessments to common item response function

At age 17, two items (N002201 and N002202) caused difficulty in scaling. In preliminary calibrations, both items did not fit the model well and had large slope-parameter values (3.9 and 5.0, respectively). The item response function of N002202 also demonstrated an elevated tail. Further examination of the items indicated that this might be due to local dependence of the items, although neither item had been problematic at this age group in the 1994 assessment. The approach of fixing the slope-parameter was taken to obtain stable item parameter estimates. At calibration stage-two, after the estimation of the proficiency distribution was constrained to be normally distributed and calibrated to convergence, the slope-parameter of N002201 was fixed at the value, and all items were calibrated to convergence. Parameters estimates from this run served as the final estimates for age 17.

A list of the items scaled for each of the ages, along with their item parameter estimates, appears in Appendix D.

14.5 GENERATION OF PLAUSIBLE VALUES

The generation of plausible values was conducted independently for each age/grade level for each of the assessment years. The item parameters from BILOG/PARSCALE, final student weights, item responses, and selected background variables were used with the computer program BGROUP (described in Chapter 11) to generate the values for each age. The background variables included student demographic characteristics (i.e., race/ethnicity of the student, highest level of education attained by parents), students' perceptions about reading, and student behavior both in and out of school (e.g., amount of television watched daily, amount of homework done each day). Appendix C gives the codings for the conditioning variables for the three age groups. Table 14-8 contains a list of the number of background contrasts included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each age/grade.

Table 14-8

Proportion of Proficiency Variance Accounted for by the Conditioning Model for the Reading Long-Term Trend Assessment

Age/Grade	Number of Conditioning Contrasts[1]	Proportion of Proficiency Variance
9/4	49	.32
13/8	49	.35
17/11	47	.34

[1] Excluding the constant term.

14.6 THE FINAL READING LONG-TERM TREND SCALE

The linear indeterminacy of the long-term trend scale was resolved by linking the 1996 long-term trend scales to previous long-term trend scales. For each age, the item parameters from the joint calibration based on data from both 1994 and 1996 were used with the 1994 data to reestimate plausible values for the 1994 data. The mean and standard deviation of the new 1994 estimates were calculated and matched to the mean and standard deviation of the old 1994 plausible values that were reported previously. The linear constants of this transformation were then applied to transform the 1996 scales to the 1994 proficiency metric. The transformation equations (described in Chapter 9) that resulted from this matching of the first two moments for the 1994 data are

$$\text{Age 9: } \theta_{\text{target}} = 54.57 \bullet \theta_{\text{calibrated}} + 206.13,$$

$$\text{Age 13: } \theta_{\text{target}} = 39.06 \bullet \theta_{\text{calibrated}} + 257.88, \text{ and}$$

$$\text{Age 17: } \theta_{\text{target}} = 44.14 \bullet \theta_{\text{calibrated}} + 283.19,$$

where θ_{target} denotes values on the final transformed scale, and $\theta_{\text{calibrated}}$ denotes values on the calibration scale. Overall summary statistics for the long-term trend samples are given in Table 14-9.

As in the past, interpretation of the long-term trend results was facilitated through the provision of scale anchoring information. In 1984, five NAEP reading scale levels were selected as anchor points. These points (described in *Trends in Academic Progress*) are:

150 = simple, discrete reading tasks;
200 = partially developed skills and understanding;
250 = interrelation of ideas and generalizations;
300 = understanding complicated information; and
350 = learning from specialized reading materials.

Detailed descriptions of the skills required to read at each level were derived and benchmark exercises were selected to exemplify each level. These same anchor points were used in the 1988, 1990, 1992, 1994, and 1996 reading long-term trend reports. The estimated proportion of students in each reporting category who are at or above each anchor point was examined in *Trends in Academic Progress*.

14.7 PARTITIONING OF THE ESTIMATION ERROR VARIANCE

For each age, the error variance of the final, transformed proficiency mean was partitioned into two parts as described in Chapter 11. This analysis yielded estimates of the proportion of error variance due to sampling students, and the proportion of error variance due to the latent nature of θ. These estimates are given in Table 14-10 (for stability, the estimates of the between-imputation variance, B, in Equation 11.9 are based on 100 imputations). More detailed information is available for gender and race/ethnicity subgroups in Appendix E.

Table 14-9

Means and Standard Deviations on the Reading Long-Term Trend Scale

	Assessment	All Five Plausible Values	
Age	Year	Mean	S.D.
9	1984	211.0	41.1
	1988	211.8	41.2
	1990	209.2	44.7
	1992	210.5	40.4
	1994	211.0	40.5
	1996	212.4	40.5
13	1984	257.1	35.5
	1988	257.5	34.7
	1990	256.8	36.0
	1992	259.8	39.4
	1994	257.9	39.8
	1996	259.1	38.4
17	1984	288.8	40.3
	1988	290.1	37.1
	1990	290.2	41.3
	1992	289.7	43.0
	1994	288.1	44.4
	1996	286.9	42.3

Table 14-10

Estimation Error Variance and Related Coefficients for the Reading Long-Term Trend Assessment

		Proportion of Variance Due to ...	
Age	Total Estimation of Error Variance	Student Sampling	Latency of θ
9	1.01	0.86	0.14
13	0.93	0.85	0.15
17	1.08	0.82	0.18

Chapter 15

DATA ANALYSIS FOR THE LONG-TERM TREND MATHEMATICS ASSESSMENT[1]

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15.1 INTRODUCTION

This chapter describes the analyses performed on the responses to the cognitive and background items in the 1996 long-term trend assessment of mathematics. The emphasis of this chapter is on the methods and results of procedures used to develop the IRT-based scale scores; however, some attention is given to the analysis of constructed-response items. The theoretical underpinnings of the IRT and plausible values methodology described in this chapter are given in Chapter 11.

The objectives of the mathematics analyses were to prepare scale values and perform all analyses necessary to produce a long-term trend report in mathematics. The mathematics long-term trend results include the years 1973, 1978, 1982, 1986, 1990, 1992, 1994, and 1996. The results of 1996 long-term trend assessment of mathematics are presented in the *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997).

The student samples that were administered mathematics items in the 1996 long-term trend assessment are shown in Table 15-1. See Chapters 1 and 3 for descriptions of the target populations and the sample design used for the assessment.

Table 15-1
NAEP 1996 Mathematics Long-Term Trend Student Samples

Sample	Booklet IDs	Mode	Cohort Assessed	Time of Testing	Age Definition	Modal Grade	Number Assessed
9 [MS-LTTrend]	91-93	Tape	Age 9	1/3/96 - 3/8/96 (Winter)	CY	4	5,414
13 [MS-LTTrend]	91-93	Tape	Age 13	10/9/95 - 12/22/95 (Fall)	CY	8	5,658
17 [MS-LTTrend]	84-85	Tape	Age 17	3/11/96 - 5/10/96 (Spring)	Not CY	11	3,539

LEGEND

MS	Mathematics and science
LTTrend	Long-term trend assessment: booklets are identical to 1986 long-term trend assessments
Tape	Audiotape administration
CY	Calendar year: birthdates (1996 sample) in 1986 and 1982 for ages 9 and 13
Not CY	Age 17 only (1996 sample): birthdates between October 1 and September 30 of the appropriate years

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[1] Jiahe Qian was the primary person responsible for the planning, specification, and coordination of the mathematics long-term trend analyses. Computer activities for all long-term trend mathematics scaling and data analyses were performed by Norma Norris. Nancy Allen and Eiji Muraki provided consultation.

Data from the 1996 long-term trend samples that contributed to the trends in mathematics achievement were scaled separately from the 1996 mathematics main samples. Accordingly, the long-term trend analysis and main analysis are presented in separate chapters. This chapter pertains to the scaling of the long-term trend data; information about the scaling of the data from the mathematics main assessment samples is presented in Chapter 12.

The long-term trend results reported in the *NAEP 1996 Trends in Academic Progress* are based on paced-tape administrations and occur at all age levels. The samples involved in the analysis are shown as 9[MS-LTTrend], 13[MS-LTTrend], and 17[MS-LTTrend] in Table 15-1. For ages 9 and 13, the long-term trend booklets contained blocks of reading, mathematics and science items. In the assessments, the mathematics and science blocks were administered by audiotape to pace the students through blocks (the reading blocks were only presented in print form). The age 17 long-term trend booklets contained only mathematics and science blocks, both administered by paced-tape recordings as well. All students received a block of common background questions, yet distinct for each age. Subject-area background questions were presented in the cognitive blocks. The booklets for the age 9 and age 13 samples (Booklets 91-93) are the same as those used for long-term trend assessments in 1986, 1988, 1990, 1992, and 1994. The booklets for the age 17 sample (Booklets 84-85) are the same as those used for the 1986, 1990, 1992, and 1994 long-term trend assessments. The booklets and the blocks within those booklets are listed in Tables 4-20 through 4-22 in chapter 4.

Table 15-2 clarifies the relationships among the 1996 long-term trend samples and samples from previous years. For ages 9, 13, and 17, the paced-tape bridge to the 1986 samples allows direct comparisons between the samples from the long-term assessments after 1990 and the 1986 long-term trend samples. There was also a paced-tape administration in 1988, at ages 9 and 13, that was comparable to the other years. However, a paced-tape administration was not conducted at age 17 in 1988. Instead, a noncomparable paper-based assessment was administered. Hence, 1988 is not included as a point in the long-term trend reporting. In 1986, the mathematics long-term trend items were scaled with common items from the 1978 and 1982 assessments. Because the 1973 assessment had few items in common with the current assessment, data from that assessment was not scaled using the IRT model but was linked to the trend line by a linear transformation involving the mean proportion correct for common items (See *Expanding the New Design: The NAEP 1985-86 Technical Report* (Beaton, 1988)). When comparisons were made including the 1970 and 1973 assessment results, z-tests rather than t-tests were used to test statistical significance (See Section 18.5.1). The 1996 long-term trend assessment was linked to the 1973, 1978, and 1982 assessments through the 1986 assessment. Information about previous assessment years is available in *Expanding the New Design: The NAEP 1985-86 Technical Report* (Beaton, 1988), *The NAEP 1992 Technical Report* (Johnson & Carlson, 1994), and *The NAEP 1994 Technical Report* (Allen, Kline, & Zelenak, 1996).

Table 15-3 indicates the number of items in common across different age combinations. Table 15-4 shows the number of items scaled in 1996 that were common across assessment years. The 1986, 1990, 1992, 1994, and 1996 assessments had all items in common. For age 9, the number of items common across assessment years 1978 to 1996 was only 35; for age 13, it was 56; and for age 17, it was 54. Item parameters were estimated assuming a univariate scale, since the number of items presented to each student was small and there were too few items to estimate several content area scales separately.

Table 15-2

NAEP Mathematics Samples Contributing to 1996 Long-Term Trend Results, 1973-1996

Cohort Assessed	Year	Sample	Subjects	Time of Testing	Mode of Administration	Age Definition	Modal Grade
Age 9	1973	Main	MS	Winter	Tape	CY	4
	1978	Main	M	Winter	Tape	CY	4
	1982	Main	MCS	Winter	Tape	CY	4
	1986	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1990	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1992	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1994	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1996	LTTrend[1]	MS	Winter	Tape[2]	CY	4
Age 13	1973	Main	MS	Fall	Tape	CY	8
	1978	Main	M	Fall	Tape	CY	8
	1982	Main	MCS	Fall	Tape	CY	8
	1986	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1990	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1992	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1994	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1996	LTTrend[1]	MS	Fall	Tape[2]	CY	8
Age 17	1973	Main	MS	Spring	Tape	Not CY	11
	1978	Main	M	Spring	Tape	Not CY	11
	1982	Main	MCS	Spring	Tape	Not CY	11
	1986	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1990	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1992	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1994	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1996	LTTrend[1]	MS	Spring	Tape	Not CY	11

[1] Within an age group, these samples received common booklets.

[2] Mathematics and science administered by audiotape, reading administered by print.

LEGEND

M	Mathematics	Main	Main assessment
MS	Mathematics and science	Tape	Audiotape administration
MCS	Mathematics, civics, and science	CY	Calendar year: birthdates (1996 sample) in 1986 and 1982 for ages 9 and 13
LTTrend	Long-term trend: booklets are identical to the long-term trend assessment of 1986.	Not CY	Age 17 only (1996 sample): birthdates between October 1 and September 30 of the appropriate years

The steps in the mathematics long-term trend analysis are documented in the following sections. Consistent with the procedures in earlier NAEP analyses, the first step was to calculate standard item statistics. The results served as a check for data entry errors and as a reasonableness check against results from previous assessments.

The second step was to fit an IRT model to the data from the 1996 and 1994 assessments for each age separately. This procedure puts item parameters and ability estimates on the same scale across years. The same item may have different item parameters for different age groups.

Table 15-3

Numbers of Scaled Mathematics Long-Term Trend Items Common Across Ages

Age	Booklet Numbers	Number of Items
Total		153
9 only	91-93	32
13 only	91-93	30
17 only	84-85	41
9 and 13 only	91-93, 91-93	20
9 and 17 only	91-93, 84-85	0
13 and 17 only	91-93, 84-85	27
9, 13, and 17	91-93, 91-93, 84-85	3

Table 15-4

Numbers of Scaled Mathematics Long-Term Trend Items Common Across Assessments

	Number of Items		
Assessment Year	Age 9	Age 13	Age 17
1986, 1990, 1992, 1994, 1996	55	80	71
1982, 1986, 1990, 1992, 1994, 1996	53	79	65
1978, 1986, 1990, 1992, 1994, 1996	35	56	54
1978, 1982, 1986, 1990, 1992, 1994, 1996	35	56	54

Next, the analysis for an age group was completed by the creation of plausible values through a multiple imputation estimation procedure in which item parameter estimates, student responses, and student background information were combined to produce the most precise possible estimates of student subgroup ability. Plausible values were used to calculate proficiency means for the entire sample and for the selected subgroups.

Finally, the scales of the 1996 trend assessment were transformed to proficiency scale used in previous mathematics trend assessments. These proficiency means constitute the last point in the mathematics long-term trend from 1973 to 1996. The only available estimates of the proficiency means for 1973 were linked via extrapolation to the IRT scale, but the data from that year was never scaled using an IRT model.

15.2 ITEM ANALYSIS FOR THE MATHEMATICS LONG-TERM TREND ASSESSMENT

No problems in coding, formats, or data were detected. The conventional item analysis, with results displayed in Table 15-5, was performed at the block level on the paced-tape long-term trend data.

Table 15-5 contains the number of items, size of the sample administered to the block, mean weighted proportion correct, mean weighted r-biserial, and mean weighted alpha as a measure of reliability for each block. The average values were calculated using examinee weights and the items in the block that were scaled. The 1996 item-level statistics were not very different from those for the 1994 assessment. Similar statistics for the 1994 assessment were reported in Table 16-5 of *The NAEP 1994 Technical Report.*

Table 15-5

Descriptive Statistics for Item Blocks in the Mathematics Long-Term Trend Samples (1996)

	Block		
Statistic	**M1**	**M2**	**M3[1]**
Age 9			
Number of scaled items	24	26	5
Number of scaled constructed response items	9	9	0
Unweighted sample size	1,852	1,841	1,721
Average weighted proportion correct	.62	.64	.68
Average weighted r-biserial	.61	.65	.83
Weighted alpha reliability	.82	.86	.50
Age 13			
Number of scaled items	36	36	8
Number of scaled constructed response items	9	8	0
Unweighted sample size	1,928	1,864	1,866
Average weighted proportion correct	.68	.62	.66
Average weighted r-biserial	.59	.55	.68
Weighted alpha reliability	.87	.85	.61
Age 17			
Number of scaled items	33	33	5
Number of scaled constructed response items	10	5	1
Unweighted sample size	1,848	1,848	1,691
Average weighted proportion correct	.66	.67	.56
Average weighted r-biserial	.69	.63	.76
Weighted alpha reliability	.90	.87	.54

[1] This block is mostly calculator items, which were not analyzed. For the item analysis, students who did not respond to any items in the block were omitted; however, such students were assigned proficiencies in the final database.

In the 1996 mathematics long-term trend assessment, 20 percent of the samples of the constructed-response items were used to check the interrater reliability—the score agreement between first and second raters. The percent of exact agreement ranged from 96.3 to 100 percent; and the intraclass correlation ranged from .902 to 1.00—except .886 for item N269201 in the age 13 sample. In general, the interrater reliability was very high in the 1996 mathematics long-term trend assessment.

The correspondence between blocks, booklets, and samples is given for the mathematics long-term trend assessment in Tables 4-20 through 4-22 in Chapter 4. Common labeling of these blocks across ages does not denote common items.

15.3 IRT SCALING FOR THE MATHEMATICS LONG-TERM TREND ASSESSMENT

15.3.1 Item Parameter Estimation

The scaling process began with the estimation of item parameters. IRT parameters were estimated using the NAEP version of the BILOG/PARSCALE program (Mislevy & Bock, 1982; Muraki & Bock, 1991) described in Chapter 11. Item calibration was performed separately for each of the three age groups, using the total combined data from the 1994 and 1996 assessments. Including the 1994 assessment data assures that item parameters will be similar for adjacent assessments so that year-to-year trends will not be distorted by abrupt changes in calibration. The calibration was performed on the entire sample of students, resulting in a range of about 1,700 to 1,900 examinee responses to each item in each assessment year. The calibration was based on student weights that were rescaled for the 1996 data so that the sum of the weights equaled the unweighted sample size. Also, weights for the 1996 data were restandardized to give equal weight to the two assessment years included in the scaling. As with the previous assessment, calculator items were excluded from the analysis. Because calculators have changed greatly since the start of the long-term trend assessment, it was judged that calculator questions are no longer comparable across time. These items were kept in the assessment, since excluding them would have changed the testing context.

Since parameters for items in blocks M1, M2, and M3 were estimated separately for ages 9, 13, and 17, items administered at more than one age have multiple sets of item parameter estimates. Items were examined for lack of fit with the data. Those that exhibited extreme violation of IRT assumptions (i.e., did not have monotonically increasing item characteristic curves) were deleted from the analysis, as they were in previous assessments. Other items were deleted because they were calculator items, which were not considered part of the regular assessment. These excluded items appear in Tables 15-6, 15-7, and 15-8. As a result of these deletions, 55 items were scaled for age 9, 80 items were scaled for age 13, and 71 items were scaled for age 17. Of the 153 noncalculator items that were part of the assessment, seven items (5%) were excluded due to poor fit with the data. A list of the items scaled for each of the ages, along with their item parameter estimates, appears in Appendix D.

15.4 DERIVED BACKGROUND VARIABLES

In the long-term trend analysis, all derived background variables were used to define subgroups of students for reporting. For this reason, these variables were also used in conditioning. Derived reporting variables are described in Appendix B.

Table 15-6

Items Deleted from the Age 9 Mathematics Long-Term Trend Analysis

Booklet IDs	Block	Item	Reason for Exclusion
91	M1	N252601	Was deleted in prior assessment
		N262502	Was deleted in prior assessment
92	M3	N268221	Calculator item[1]
		N276021	Calculator item
		N276022	Calculator item
		N276821	Calculator item
		N276822	Calculator item
		N276823	Calculator item
		N277621	Calculator item
		N277622	Calculator item
		N277623	Calculator item
		N284021	Calculator item
		N284022	Calculator item

[1] All calculator items were deleted from the analysis.

Table 15-7

Items Deleted from the Age 13 Mathematics Long-Term Trend Analysis

Booklet IDs	Block	Item	Reason for Exclusion
91	M1	N262502	Was deleted in prior assessment
93	M2	N261601	Was deleted in prior assessment
92	M3	N264521	Calculator item[1]
		N259921	Calculator item
		N276821	Calculator item
		N276822	Calculator item
		N276823	Calculator item
		N278921	Calculator item
		N278922	Calculator item
		N278923	Calculator item
		N278924	Calculator item
		N278925	Calculator item
		N280621	Calculator item
		N280622	Calculator item
		N280623	Calculator item
		N280624	Calculator item
		N280625	Calculator item
		N280626	Calculator item

[1] All calculator items were deleted from the analysis.

Table 15-8

Items Deleted from the Age 17 Mathematics Long-Term Trend Analysis

Booklet IDs	Block	Item	Reason for Exclusion
84	M1	N282801	Was deleted in prior assessment
		N285701	Was deleted in prior assessment
84	M2	N266801	Was deleted in prior assessment
		N255301	Was deleted in prior assessment
85	M3	N259921	Calculator item[1]
		N264321	Calculator item
		N264521	Calculator item
		N267921	Calculator item
		N276821	Calculator item
		N276822	Calculator item
		N276823	Calculator item
		N278921	Calculator item
		N278922	Calculator item
		N278923	Calculator item
		N278924	Calculator item
		N278925	Calculator item
		N280621	Calculator item
		N280622	Calculator item
		N280623	Calculator item
		N280624	Calculator item
		N280625	Calculator item
		N280626	Calculator item
		N285321	Calculator item

[1] All calculator items were deleted from the analysis.

15.5 GENERATION OF PLAUSIBLE VALUES

Plausible values were calculated separately for each age group. In this phase of analysis, student background information was used to condition item responses in order to more accurately estimate average subgroup abilities. The conditioning program BGROUP was used to combine NAEP BILOG/PARSCALE item parameters with weighted item responses and background variables to produce posterior ability estimates called plausible values. As defined in Chapter 11, BGROUP is an enhanced version of the original conditioning program, MGROUP. *Plausible values are not test scores* in the usual sense, but can be used to provide consistent estimates of population characteristics. There were 53 contrasts in the conditioning model at age 9, 56 at age 13, and 63 at age 17. Appendix C gives the codings for the conditioning variables for the three age groups. A check was made on the distributions of the plausible values for each age, including inspection of the whole group and subgroup means and standard deviations. Table 15-9 contains a list of the number of background contrasts included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each age/grade.

Table 15-9

Proportion of Proficiency Variance Accounted for by the Conditioning Model for the Mathematics Long-Term Trend Assessment

Age/Grade	Number of Conditioning Contrasts[1]	Proportion of Proficiency Variance
9/4	53	.37
13/8	56	.35
17/12	63	.57

[1] Including the constant term.

15.6 THE FINAL MATHEMATICS LONG-TERM TREND SCALE

Since the plausible value (theta) scales have a linear indeterminacy, comparisons with previous assessments will be sensible only if the scale is linearly transformed to a meaningful metric. This indeterminacy was resolved by linking the 1996 scales to previous long-term trend scales. The 1996 data had to be transformed to compensate for linear changes in the scale due to employing newly estimated item parameters and new BGROUP conditioning parameters in 1996. The transformation was accomplished by first reestimating the 1994 student abilities using 1996 item parameters and 1996 BGROUP parameters. (For score metric transformation, see Chapter 9.) The new 1994 ability estimates were then equated to the old 1994 ability estimates by matching the first two moments (i.e., the mean and standard deviation). The constants for this transformation were then applied to the 1996 data. The transformation equations that resulted are

$$\text{Age 9: } \theta_{\text{target}} = 34.04 \bullet \theta_{\text{calibrated}} + 230.46$$

$$\text{Age 13: } \theta_{\text{target}} = 33.08 \bullet \theta_{\text{calibrated}} + 273.91$$

$$\text{Age 17: } \theta_{\text{target}} = 30.46 \bullet \theta_{\text{calibrated}} + 306.57,$$

where θ_{target} denotes an individual's value on the final transformed scale of the 1996 data and $\theta_{\text{calibrated}}$ denotes an individual's value on the original 1996 theta scale. Overall summary statistics for the long-term trend samples are given in Table 15-10. For the descriptions of the results of the mathematics long-term trend study, see *NAEP 1996 Trends in Academic Progress* (Campbell, Voelkl, & Donahue, 1997).

To provide a context for interpreting the overall mathematics long-term trend results, the NAEP mathematics results were "anchored" at five NAEP mathematic scale levels. These points (described in the *NAEP 1996 Trends in Academic Progress*) are:

150 = simple arithmetic facts;
200 = beginning skills and understanding;
250 = numerical operations and beginning problem solving;
300 = moderately complex procedures and reasoning; and
350 = multi-step problem solving and algebra.

These same anchor points were used in the 1978, 1982, 1986, 1990, 1992, and 1994 mathematics long-term trend reports.

Table 15-10

Means and Standard Deviations on the Mathematics Long-Term Trend Proficiency Scale

Age	Assessment	All Five Plausible Values Mean	 S. D.
9	1978	218.6	36.0
	1982	219.0	34.8
	1986	221.7	34.0
	1990	229.6	32.9
	1992	229.6	33.1
	1994	231.1	33.2
	1996	231.0	33.8
13	1978	264.1	39.0
	1982	268.6	33.4
	1986	269.0	30.8
	1990	270.4	31.3
	1992	273.1	30.9
	1994	274.3	32.4
	1996	274.3	31.6
17	1978	300.4	34.9
	1982	298.5	32.4
	1986	302.0	31.0
	1990	304.6	31.3
	1992	306.7	30.1
	1994	306.2	30.2
	1996	307.2	30.2

15.7 PARTITIONING OF THE ESTIMATION ERROR VARIANCE

For each age's scale, the error variance of the final transformed proficiency mean was partitioned as described in Chapter 11. The partition of error variance consists of two parts: the proportion of error variance due to sampling students (sampling variance) and the proportion of error variance due to the fact that proficiency, θ, is a latent variable that is estimated rather than observed. Table 15-11 contains estimates of the total error variance, the proportion of error variance due to sampling students, and the proportion of error variance due to the latent nature of θ (for stability, the estimates of the between-imputation variance, *B*, in Equation 11.9 are based on 100 imputations.).

Table 15-11

Estimation Error Variance and Related Coefficients for the Mathematics Long-Term Trend Assessment

Age	Total Estimation Error Variance	Proportion of Variance Due to . . . Student Sampling	 Latency of θ
9	0.66	0.85	0.15
13	0.66	0.89	0.11
17	1.24	0.93	0.07

More detailed information is available for gender and race/ethnicity subgroups in Appendix E.

Chapter 16

DATA ANALYSIS FOR THE LONG-TERM TREND SCIENCE ASSESSMENT[1]

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16.1 INTRODUCTION

This chapter describes the analyses performed on the responses to the cognitive and background items in the 1996 long-term trend assessment of science. The objectives of the science analyses are to prepare scale values and perform all analyses necessary to produce a long-term trend report in science. The results obtained from these analyses includes the years 1969-1970, 1973, 1977, 1982, 1986, 1990, 1992, 1994, and 1996, and are presented in the *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997). The theoretical underpinnings of the IRT and the plausible values methodology used in this chapter are described in Chapter 9 and Chapter 11, and are therefore not detailed here.

The student samples that were administered science items in the 1996 long-term trend assessment are shown in Table 16-1 as 9[MS-LTTrend], 13[MS-LTTrend], and 17[MS-LTTrend]. (See Chapters 1 and 3 for descriptions of the target populations and the sample design used for the assessment.) Data from the long-term trend samples that contributed to the trends in science achievement were scaled separately from the 1996 science main focused-BIB samples. Accordingly, the long-term trend and main analyses are presented in separate chapters. Information about the scaling of the data from the science main focused-BIB samples is presented in Chapter 13.

The science long-term trend results reported in the *NAEP 1996 Trends in Academic Progress* are based on paced-tape administrations at all three age levels. For ages 9 and 13, the long-term trend booklets contain one mathematics block, one reading block, and one science block. The science and mathematics blocks were paced by tape-recordings (i.e., tape-recordings were used to be sure that the items were read in a consistent manner in every session and pace students through the blocks) and the reading block was presented in print form only and were not paced by tape-recordings. The age 17 long-term trend booklets contain only mathematics and science blocks, both paced by tape-recordings. All students received a block of common background questions, distinct for each age. Subject-area background questions were presented in the cognitive blocks. The booklets for the age 9 and age 13 samples (Booklets 91-93) and the booklets for the age 17 samples (Booklets 84-85) are the same as those used for long-term trend assessments in 1986, 1990, 1992, and 1994. The booklets and the blocks within those booklets are listed in Chapter 4. Additional information about all of the items in these blocks is also found in that chapter. This chapter includes specific information about the long-term trend items that were scaled.

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[1] Jinming Zhang was the primary person responsible for the planning, specification, and coordination of the science long-term trend analyses. Computer activities for all long-term trend science scaling and data analyses were performed by Norma Norris. Nancy Allen, Eiji Muraki, and John Donoghue provided consultation.

Table 16-1

NAEP 1996 Long-Term Trend Science Student Samples

Sample	Booklet IDs	Mode	Cohort Assessed	Time of Testing	Age Definition	Modal Grade	Number Assessed
9 [MS-LTTrend]	91-93	Tape	Age 9	1/3/96 – 3/8/96 (Winter)	CY	4	5,414
13 [MS-LTTrend]	91-93	Tape	Age 13	10/9/95 – 12/22/95 (Fall)	CY	8	5,658
17 [MS-LTTrend]	84-85	Tape	Age 17	3/11/96 – 5/10/96 (Spring)	Not CY	11	3,539

LEGEND

MS	Mathematics and science
LTTrend	Long-term trend assessment: booklets are identical to 1986 long-term trend assessments
Tape	Audiotape administration
CY	Calendar year: birthdates in 1986 and 1982 for ages 9 and 13, respectively
Not CY	Age 17 only: birthdates between October 1, 1978, and September 30, 1979

Table 16-2 clarifies the relationships among the 1996 long-term trend samples and samples from previous years. For all ages, the 1996 science long-term trend samples allow direct comparisons with 1986, 1990, 1992, and 1994 long-term trend samples because the same booklets were used in these assessments. There was also a tape administration in 1988 at ages 9 and 13 that was comparable to the other years. However, a tape administration was not conducted at age 17 in 1988. Instead, a noncomparable paper-based assessment was conducted. Hence, 1988 is not included as a point in the long-term trend reporting. In 1986, the science long-term trend items were scaled with common items from the 1977 and 1982 assessments. Because of the small number of items in common with those in the 1969-70 and 1973 assessments, data from the 1969-70 and 1973 assessments were not scaled using the IRT model, but were linked to the long-term trend line by a linear transformation involving the logit of mean proportion correct for common items. When comparisons were made including the 1969-70 and 1973 assessment results, z-tests rather than t-tests were used to test statistical significance (See Section 18.5.1). From 1990, each new long-term trend assessment was linked to the previous assessments through the last assessment. For instance, the 1996 long-term trend assessment was linked to the previous assessments through the 1994 long-term trend assessment. Information about previous assessment years, including 1969-70 and 1973, is available in Chapter 11 of *Expanding the New Design: The NAEP 1985-86 Technical Report* (Yamamoto, 1988), Chapter 14 of *The NAEP 1990 Technical Report* (Johnson & Allen, 1992), Chapter 14 of *The NAEP 1992 Technical Report* (Allen & Isham, 1994), and Chapter 17 of *The NAEP 1994 Technical Report* (Swinton, Allen, Isham & Chen, 1996).

The numbers of scaled items in common across different ages are presented in Table 16-3. As was done with previous long-term trend analyses, each age was scaled separately and the long-term trend scales are univariate. Derivation of scales for specific content areas was not feasible given the limited number of items presented to students in the long-term trend samples. The number of items scaled in 1996 that were common across assessment years is presented in Table 16-4.

The steps in the science long-term trend analysis are documented in the following sections. As is usual in NAEP analyses, the first step was to gather item-level and block-level information. Then, the cognitive items were calibrated according to the IRT model. Next, derived background variables were calculated, and plausible values were generated after conditioning on available background variables and selected two-way interactions. Finally, the scale values were placed on the final science long-term trend scale used in previous trend assessments.

Table 16-2

NAEP Science Samples Contributing to 1996 Long-Term Trend Results, 1970-1996

Cohort Assessed	Year	Sample	Subjects	Time of Testing	Mode of Administration	Age Definition	Modal Grade
Age 9	1970	Main	SWC	Winter	Tape	CY	4
	1973	Main	MS	Winter	Tape	CY	4
	1977	Main	SCI	Winter	Tape	CY	4
	1982	Main	MSC	Winter	Tape	CY	4
	1986	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1990	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1992	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1994	LTTrend[1]	MS	Winter	Tape[2]	CY	4
	1996	LTTrend[1]	MS	Winter	Tape[2]	CY	4
Age 13	1970	Main	SWC	Fall	Tape	CY	8
	1973	Main	MS	Fall	Tape	CY	8
	1977	Main	SCI	Fall	Tape	CY	8
	1982	Main	MSC	Fall	Tape	CY	8
	1986	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1990	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1992	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1994	LTTrend[1]	MS	Fall	Tape[2]	CY	8
	1996	LTTrend[1]	MS	Fall	Tape[2]	CY	8
Age 17	1969	Main	SWC	Spring	Tape	Not CY	11
	1973	Main	MS	Spring	Tape	Not CY	11
	1977	Main	SCI	Spring	Tape	Not CY	11
	1982	Main	MSC	Spring	Tape	Not CY	11
	1986	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1990	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1992	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1994	LTTrend[1]	MS	Spring	Tape	Not CY	11
	1996	LTTrend[1]	MS	Spring	Tape	Not CY	11

[1] Within an age group, these samples received common booklets.

[2] Mathematics and science administered by audiotape, reading administered by print.

LEGEND

SCI	Science	LTTrend	Long-term trend: booklets are identical to the long-term trend assessment of 1986
MS	Mathematics and science		
MSC	Mathematics, science, and citizenship	Tape	Audiotape administration
SWC	Science, writing, and citizenship	CY	Calendar year: birthdates in 1986 and 1992 for ages 9 and 13 in the 1996 assessment
Main	Main assessment	Not CY	Age 17 only: birthdates between October 1 and September 30 of the appropriate years

Table 16-3

Numbers of Scaled Science Long-Term Trend Items Common Across Ages

Age	Booklet Numbers	Number of Items
9 only	91-93	55
13 only	91-93	30
17 only	84-85	32
9 and 13 only	91-93, 91-93	0
9 and 17 only	91-93, 84-85	0
13 and 17 only	91-93, 84-85	45[1]
9, 13, and 17	91-93, 91-93, 84-85	1
Total		163

[1] One of these items (N406303) was treated as a different item from 1990 in the scaling of the 1992 assessment, but only for age 13. It was treated as an item common to 1992, 1994 and 1996 for all ages in the 1994 and 1996 assessments.

Table 16-4

Numbers of Scaled Science Long-Term Trend Items Common Across Assessments

	Number of Items		
Assessment Years	Age 9	Age 13	Age 17
1986, 1990, 1992, 1994,1996	56	76	78
1982, 1986, 1990, 1992, 1994,1996	10[1]	58	47
1977, 1986, 1990, 1992, 1994,1996	56	76	76
1977, 1982, 1986, 1990, 1992, 1994, 1996	10[1]	58[2]	45

[1] Twenty-four items common to years 1977 and 1982, but not later years, were included in the 1986 scaling of these items to stabilize the estimation of the item parameters. See *Expanding the New Design: The NAEP 1985-86 Technical Report* for more information.

[2] One of these items (N406303) was treated as a different item from 1990 in the scaling of the 1992 assessment, but only for age 13. It was treated as an item common to 1992, 1994 and 1996 in the 1994 and 1996 assessments for all ages.

16.2 ITEM ANALYSIS FOR THE SCIENCE LONG-TERM TREND ASSESSMENT

Conventional item analyses did not identify any difficulties with the 1996 long-term trend data for the 1996 samples that bridge to 1986. Table 16-5 contains information about the science long-term trend blocks. These blocks were presented to samples 9[MS-LTTrend], 13[MS-LTTrend], and 17[MS-LTTrend]. At all ages, the blocks labeled S1, S2, and S3 were presented intact to students in the 1986, 1990, 1992, 1994, and 1996 long-term trend samples. The age 9 and age 13 blocks appeared in Booklets 91 through 93. For age 17, Block S3 was in Booklet 84, and Blocks S1 and S2 were in Booklet 85. The correspondence between blocks, booklets, and samples is given for the long-term trend assessment in Tables 4-14 through 4-16 in Chapter 4. Common labeling of these blocks across ages does not denote common items.

Table 16-5 contains the number of scaled items, size of the sample administered to the block, mean weighted proportion correct, mean weighted r-biserial, and mean weighted alpha as a measure of reliability for each block. The average values were calculated using examinee sampling weights and the responses to the items in the block that were scaled. On average, the 1996 item-level statistics were not very different from those for the 1994 assessments. The percent of examinees not reaching items in the science long-term trend blocks was almost always zero because the items were administered with a tape-recording to pace response time.

Table 16-5
Descriptive Statistics for Item Blocks in the Science Long-Term Trend Samples (1996)

Statistic	Blocks S1	 S2	 S3
Age 9			
Number of scaled items	17	20	19
Number of scaled constructed-response items	0	0	0
Unweighted sample size	1,852	1,721	1,841
Average weighted proportion correct	0.62	0.58	0.71
Average weighted r-biserial	0.57	0.48	0.58
Weighted alpha reliability	0.71	0.64	0.73
Age 13			
Number of scaled items	23	30	23
Number of scaled constructed-response items	0	0	0
Unweighted sample size	1,928	1,866	1,864
Average weighted proportion correct	0.53	0.56	0.61
Average weighted r-biserial	0.53	0.50	0.52
Weighted alpha reliability	0.74	0.79	0.72
Age 17			
Number of scaled items	24	31	23
Number of scaled constructed-response items	0	0	0
Unweighted sample size	1,691	1,691	1,848
Average weighted proportion correct	0.65	0.65	0.61
Average weighted r-biserial	0.49	0.54	0.64
Weighted alpha reliability	0.68	0.79	0.82

16.3 IRT SCALING FOR THE SCIENCE LONG-TERM TREND ASSESSMENT

16.3.1 Item Parameter Estimation

The first step in the scaling process was the estimation of item parameters for the long-term trend items. This item calibration was performed using the NAEP version of the BILOG/PARSCALE program, which combines Mislevy and Bock's (1982) BILOG and Muraki and Bock's (1991) PARSCALE computer programs. Items were calibrated separately for each of the three age groups, using combined data from the 1994 and 1996 assessment years and treating each assessment sample as a sample from a separate subpopulation. In several previous long-term trend analyses, combined data from the last assessment and the current assessment were used for item parameter estimation. The purposes for including the last long-term trend assessment data are to assure that item parameter estimates will be similar for adjacent assessments so that year-to-year trends will not be distorted by abrupt changes in calibration, and to make it possible to link the current long-term trend assessment to the previous assessments through the last assessment. Student weights were used for the calibration. To ensure that each assessment year had a similar influence on the calibration, student weights for each 1994 age group were multiplied by a constant, to adjust them to have the same sum as the sum of the student weights for the corresponding 1996 age group.

Although other items were examined for irregularities, only items that were deleted from the previous scaling of the paced-tape long-term trend data were excluded in the 1996 analysis. Eight percent of the items (18 items) administered to the long-term trend sample were excluded from analyses of previous assessments. The deleted items appear in Table 16-6. As a result of these deletions, 56 items were scaled for age 9, 76 items were scaled for age 13, and 78 items were scaled for age 17. A list of the items scaled for each of the ages, along with their item parameter estimates, appears in Appendix D.

Table 16-6

Items Deleted from the Paced-Tape Science Long-Term Trend Analysis

Age	Booklet IDs	Block	Item	Reason for Exclusion
9	91	S1	N400201	Excluded in previous assessment
	92	S2	N401701	Excluded in previous assessment
	92	S2	N402003	Excluded in previous assessment
	92	S2	N402004	Excluded in previous assessment
	92	S2	N402601	Excluded in previous assessment
	92	S2	N402603	Excluded in previous assessment
	93	S3	N403802	Excluded in previous assessment
13	91	S1	N404902	Excluded in previous assessment
	91	S1	N404903	Excluded in previous assessment
	92	S2	N407501	Excluded in previous assessment
	93	S3	N409401	Excluded in previous assessment
	93	S3	N409402	Excluded in previous assessment
	93	S3	N409403	Excluded in previous assessment
	93	S3	N409801	Excluded in previous assessment
17	85	S1	N410001	Excluded in previous assessment
	85	S1	N410002	Excluded in previous assessment
	85	S1	N410301	Excluded in previous assessment
	85	S2	N407402	Excluded in previous assessment

16.3.2 Derived Background Variables

In the long-term trend analysis, all variables derived from background questions were used both in generating plausible values and in reporting (to define subgroups). Derived conditioning and reporting variables are described in Appendix B.

16.4 GENERATION OF PLAUSIBLE VALUES

The generation of plausible values was conducted independently for each age group. The item parameters from NAEP-BILOG/PARSCALE, final student weights, item responses and selected background variables (conditioning variables) were used with the computer program BGROUP (described in Chapter 11) in order to generate the plausible values for each student. There were 49 contrasts in the conditioning model (11.8) at age 9, excluding an overall constant, 52 at age 13, and 58 at age 17. Appendix C gives the codings for the conditioning variables for the three age groups. A check on the distributions of the plausible values for each age was made. The generation of plausible values is described in more detail in Chapters 9 and 11. Table 16-7 contains a list of the number of background contrasts included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each age. This proportion is the ratio of the difference between the total variance and the BGROUP residual variance, divided by the total variance. The total variance is the mean of the five theta-scale variances obtained by their respective plausible values.

Table 16-7

Proportion of Proficiency Variance Accounted for by the Conditioning Model for the Science Long-Term Trend Assessment

Age	Number of Conditioning Contrasts[1]	Proportion of Proficiency Variance
9	49	0.33
13	52	0.37
17	58	0.46

[1] Excluding the constant term.

16.5 THE FINAL SCIENCE LONG-TERM TREND SCALE

The linear indeterminacy of the long-term trend scale was resolved by linking the 1996 long-term trend scales to the previous long-term trend scales using the following procedure. For each age, the item parameters based on combined data from 1994 and 1996 were used with the 1994 data to find plausible values for the 1994 data. The mean and standard deviation of all of the plausible values (theta scale) were calculated and matched to the mean and standard deviation of all of the science long-term trend scale scores (final reporting scale) based on the 1994 item parameters and 1994 data as reported in the *NAEP 1994 Technical Report*. The transformations that resulted from this matching of the first two moments for the 1994 data are

$$\text{Age 9: } \theta_{\text{target}} = 38.57 \bullet \theta_{\text{calibrated}} + 232.56,$$

$$\text{Age 13: } \theta_{\text{target}} = 40.11 \bullet \theta_{\text{calibrated}} + 255.54, \text{ and}$$

$$\text{Age 17: } \theta_{\text{target}} = 48.28 \bullet \theta_{\text{calibrated}} + 293.82,$$

where θ_{target} denotes values on the final reporting scale of the 1996 data and $\theta_{\text{calibrated}}$ denotes values on the original 1996 calibration (theta) scale. Overall summary statistics for the long-term trend scales are given in Table 16-8. The detailed science long-term trend results from the analyses described in this chapter are reported in *NAEP 1996 Trends in Academic Progress*.

Table 16-8
Means and Standard Deviations on the Science Long-Term Trend Scale

Age	Assessment	All Five Plausible Values Mean	S. D.
9	1977	219.9	44.9
	1982	220.8	40.9
	1986	224.3	41.6
	1990	228.7	40.2
	1992	230.6	39.9
	1994	231.0	40.9
	1996	229.7	42.2
13	1977	247.4	43.5
	1982	250.1	38.6
	1986	251.4	36.6
	1990	255.2	37.6
	1992	258.0	36.9
	1994	256.8	37.2
	1996	256.0	38.4
17	1977	289.5	45.0
	1982	283.3	46.7
	1986	288.5	44.4
	1990	290.4	46.2
	1992	294.1	44.7
	1994	294.0	45.6
	1996	295.7	45.1

As in the past, interpretation of the science long-term trend results was facilitated through the provision of scale anchoring information. In 1986, five science scale levels were selected as anchor points, using the process described in *Expanding the New Design: The 1985-86 Technical Report* (Beaton, 1988). Because the 1996 science long-term trend scale was tied to the 1986 long-term trend scale through the 1990, 1992, and 1994 data, the distribution of proficiency scores derived from the long-term trend samples can be described in terms of scale anchors. The five levels of science proficiency are

150 = Knows everyday science facts;
200 = Understands simple scientific principles;
250 = Applies basic scientific information;
300 = Analyzes scientific procedures and data; and
350 = Integrates specialized scientific information.

16.6 PARTITIONING OF THE ESTIMATION ERROR VARIANCE

For each age, the error variance of the final reporting scale mean was partitioned into two parts as described in Chapter 11. One part of the error variance is due to the sampling of students (sampling variance) and the other is due to the fact that proficiency θ is a latent variable that is estimated rather than observed. These estimates are given in Table 16-9 (for stability, the estimates of the between-imputation variance, B, in Equation 11.9 are calculated based on 100 imputations). More detailed information for gender and race/ethnicity subgroups is available in Appendix E.

Table 16-9

Estimation Error Variance and Related Coefficients for the Science Long-Term Trend Assessment

Age	Total Estimation Error Variance	Proportion of Variance Due To . . . Student Sampling	Latency of θ
9	1.13	0.81	0.19
13	1.04	0.87	0.13
17	1.40	0.86	0.14

Chapter 17

DATA ANALYSIS FOR THE LONG-TERM TREND WRITING ASSESSMENT[1]

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17.1 INTRODUCTION

This chapter describes analyses of the writing prompts[2] and background items in the 1996 long-term trend assessment of writing. These analyses led to the results reported in the *NAEP 1996 Trends in Academic Progress: Achievement of U.S. Students in Science, 1969 to 1996; Mathematics, 1973 to 1996; Reading, 1971 to 1996; and Writing, 1984 to 1996* (Campbell, Voelkl, & Donahue, 1997). Emphasis is given to the psychometric methods used to develop the composite scores that formed the basis of those reports.

The 1996 samples used for the analysis of writing achievement are presented in Table 17-1. These samples comprise students selected both on the basis of age and grade in school. For the writing long-term trend analysis, unlike other subject-area long-term trend analyses, only those students selected on the basis of grade were included in the reporting sample, which is referred to as a "grade-only" sample. The analyses were based on the full age/grade sample.

Table 17-1
NAEP 1996 Long-Term Trend Writing Student Samples

Sample	Booklet IDs	Mode	Cohort Assessed	Time of Testing	Age Definition	Modal Grade	Number Assessed
9 [RW-LTTrend]	51-56	Print	Age 9/Grade 4	Winter	CY	4	5,019
13 [RW-LTTrend]	51-56	Print	Age 13/Grade 8	Fall	CY	8	5,493
17 [RW-LTTrend]	51-56	Print	Age 17/Grade 11	Spring	Not CY	11	4,669

LEGEND

RW	Reading and writing
LTTrend	Long-term trend assessment
Print	Printed administration
CY	Calendar year: birthdates in 1986, 1982, and 1978, for ages 9, 13, and 17
Not CY	Age 17 only: birthdates between October 1 and September 30 of the appropriate years

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[1] Eiji Muraki was the primary person responsible for the planning, specification, and coordination of the writing long-term trend analyses. Computer activities for all long-term trend writing scaling and data analyses were directed and performed by Bruce Kaplan.

[2] The terms "item" and "prompt" are used interchangeably in this chapter.

The objectives of the writing analyses were to prepare scale values and perform all analyses necessary to produce a long-term trend report in writing. The writing long-term trend results include the years 1984, 1988, 1990, 1992, 1994, and 1996. Table 17-2 describes the samples of these years.

Table 17-2

NAEP Writing Samples Contributing to 1996 Long-Term Trend Results, 1984-1996

Cohort	Year	Sample	Subjects	Time of Testing	Mode	Age Definition	Modal Grade
Age 9/ Grade 4	1984	Main	RW	Winter, Spring	Print	CY	4
	1988	LTTrend[2]	RW	Winter	Print	CY	4
	1990	LTTrend[2]	RW	Winter	Print	CY	4
	1992	LTTrend[2]	RW	Winter	Print	CY	4
	1994	LTTrend[2]	RW	Winter	Print	CY	4
	1996	LTTrend[2]	RW	Winter	Print	CY	4
Age 13/ Grade 8	1984	Main	RW	Winter, Spring	Print	CY	8
	1988	LTTrend[2]	RW	Fall	Print	CY	8
	1990	LTTrend[2]	RW	Fall	Print	CY	8
	1992	LTTrend[2]	RW	Fall	Print	CY	8
	1994	LTTrend[2]	RW	Fall	Print	CY	8
	1996	LTTrend[2]	RW	Fall	Print	CY	8
Age 17/ Grade 11	1984	Main	RW	Winter, Spring	Print	Not CY	11
	1988	LTTrend[2]	RW	Spring	Print	Not CY	11
	1990	LTTrend[2]	RW	Spring	Print	Not CY	11
	1992	LTTrend[2]	RW	Spring	Print	Not CY	11
	1994	LTTrend[2]	RW	Spring	Print	Not CY	11
	1996	LTTrend[2]	RW	Spring	Print	Not CY	11

[2] Within an age class group, these samples received common booklets and constituted a trend line.

LEGEND

RW	Reading and writing
Main	Main assessment
LTTrend	Long-term trend assessment
Print	Printed administration
CY	Calendar year: birthdates in 1986 and 1982, respectively, for ages 9 and 13
Not CY	Age 17 only: birthdates between October 1, 1978, and September 30, 1979

As in the 1992 and 1994 writing assessments, the IRT scaling for the 1996 assessment used a model for polytomously scored items. The 1992 assessment established the first such scale. The 1994 assessment represented the first time that the long-term trend writing scale had to be linked to a previously established scale. The 1996 assessment was directly linked to the 1994 assessment. Sampling weights, as described in Chapter 17, were used for all analyses of the writing prompts.

17.2 LONG-TERM TREND WRITING DATA ANALYSIS

When IRT scaling was used for the long-term trend writing assessment for the first time in 1992, a new scale was developed, and data from the 1984, 1988, 1990, and 1992 long-term trend samples were reanalyzed to establish the scale. The 1994 writing long-term trend points were linked to that scale, and the 1996 writing long-term trend points, based on data from the 1996 reading/writing long-term trend samples (RW-LTTrend in Table 17-2), were linked to those 1994 writing trend points. Each subsequent assessment matched the 1984 assessment in terms of the time of administration and age definitions. The booklets used in this assessment contained blocks of reading and writing items, as well as background items. Identical booklets were used in 1984, 1988, 1990, 1992, 1994, and 1996.

The items on which the long-term trends in writing achievement are based are shown in Table 17-3. The table shows the block that contained the item in 1984 and long-term trend booklets containing the item in 1988, 1990, 1992, 1994, and 1996. Twelve writing prompts were used to measure long-term trends, with six prompts presented at each grade level. To allow comparisons in writing ability across grades, three of the six prompts presented to fourth-grade students were also presented to eighth-grade students; three of the eighth-grade prompts were also presented to eleventh-grade students; and one of the common prompts (Appleby House) was presented at all three grade levels.

Table 17-3
Assignment of 1984-96 Writing Long-Term Trend Items in 1984, 1988, 1990, 1992, 1994, and 1996

	1984 BIB-Spiral Blocks Used for Long-Term Trend Analyses			1988-96 Long-Term Trend Booklet Numbers		
Writing Task	**Age 9/ Grade 4**	**Age 13/ Grade 8**	**Age 17/ Grade 11**	**Age 9/ Grade 4**	**Age 13/ Grade 8**	**Age 17/ Grade 11**
N0003 Recreation Opportunity		C	C		52,54	52,54
N0004 Food on Frontier		D	D		51,54	51,54
N0005 Dissecting Frogs		E			53,55	
N0006 XYZ Company	E	E		52, 54	53,55	
N0009 Radio Station	G	G		54,55	55,56	
N0010 Appleby House	G	G	G	54,55	55,56	55,56
N0076 Flashlight	V[2]			56		
N0147 Plants	C			51,53		
N0148 Spaceship	E			52,54		
N0180 Space Program			E			53,55
N0190 Job Application			E			53,55
N0210 Bike Lane			G			55,56

[2] Block V was not placed in a booklet with any other writing block in 1984 (all other blocks appeared with every other block at the same grade level in 1984), and hence could not be used in scaling.

17.2.1 Primary Trait Scoring of the Writing Tasks and Measures of Scorer Reliability

All writing exercises from the 1996 assessment were scored for task accomplishment (primary trait). For the purposes of analysis, the student responses were coded as 0 (not rated), 1 (unsatisfactory), 2 (minimal), 3 (adequate), and 4 (elaborated). Not-reached and omitted items were excluded from the scaling. The writing long-term trend blocks contained either one or two items. If an item was left blank in a one-item block, it was scored as an omission. Items considered not-reached occurred only in writing blocks that had two cognitive items where the first item was answered and the second was not.

A 25 percent random subsample of all 1996 papers was rescored by a second rater to provide an estimate of interrater reliability. Although the measures of scorer agreement in NAEP have been consistently high, the possibility existed that there might be variation between the ratings provided by the group of scorers assembled in 1996 and the scorers assembled in previous years. Such a variation would be a confounding effect in trend measurement. The most direct way of controlling the effect of across-year variation in scoring would be to eliminate it entirely by rescoring all of the data from the previous four assessments, using the same set of scorers who scored the 1996 data. Unfortunately, resources did not allow for the rescoring of the full set of writing papers, but did allow for a rescoring of over 11,000 of the papers from 1988 (the numbers by prompt and grade are displayed in Table 17-4). The rescored papers for a given item constituted approximately 25 percent of all 1988 papers and consisted of all grade-eligible respondents to selected 1988 booklets containing that item. The procedure of rescoring data from other writing assessments was also used in the previous years' assessments in the current long-term trend analysis (1984, 1988, 1990, 1992, and 1994).

Because of rigorous training of scorers, it was expected that the between-year variability in scoring would be low enough to permit the use of the full set of the 1988 data. Table 17-4 shows scorer reliability, as measured by the intraclass correlation, for each prompt in the 1988, 1990, 1992, 1994, and 1996 data. The percentage of exact agreement between first and second raters is also given. In addition, the table shows the intraclass correlation and percentage of exact score agreement comparing the scores of samples of the 1990, 1992, 1994, and 1996 raters with those of the 1988 raters on a sample of the 1988 papers. The reliabilities and percentages of exact agreement (between first and second raters) were generally high for 1996 data, as they were for prior assessments (1984, 1988, 1990, 1992, and 1994).

17.3 ITEM ANALYSIS FOR THE WRITING LONG-TERM TREND ASSESSMENT

A standard item analysis for polytomous items, as described in Chapter 9, was conducted on the writing long-term trend item data. Table 17-5 displays the item analysis statistics for each grade—the number of examinees responding to each prompt, the percentage of examinees receiving each of the assigned scores, and the mean score of the prompt. R-polyserials and alpha reliabilities were not calculated since there is only one or two items per block.

The results of the item analysis were examined to verify that statistics for each item were in expected ranges. No difficulties were found in this process. Comparisons of item statistics with those of previous years were also made, and it was found that the items had similar statistics for all five years of the long-term trend in writing.

Table 17-4

Percentages of Exact Score Agreement and Interrater Reliability for the Primary Trait Scoring of the Writing Long-Term Trend Assessment Items

	1988 Data (by 1988 Raters)		1988 Data (by 1990 Raters)		1990 Data (by 1990 Raters)		1988 Data (by 1992 Raters)		1992 Data (by 1992 Raters)	
NAEP Item	**Percent Agreement**	**Reliability**	**Percent Agreement**	**Reliability**	**Percent Agreement**	**Reliability**	**Percent Agreement**	**Reliability**	**Percent Agreement**	**Reliability**
Age 9/Grade 4										
N0006 XYZ Company	97.1	.99	91.1	.90	88.8	.83	90.9	.92	88.0	.89
N0009 Radio Station	93.5	.95	89.0	.90	92.1	.93	92.0	.93	90.9	.93
N0010 Appleby House	90.3	.92	76.9	.78	78.5	.72	79.7	.83	78.4	.80
N0076 Flashlight	87.5	.88	80.5	.74	78.2	.77	76.6	.71	79.5	.75
N0147 Plants	94.3	.95	88.5	.89	82.4	.86	91.3	.92	88.5	.90
N0148 Spaceship	91.8	.95	83.7	.89	75.2	.82	77.8	.84	75.7	.79
Age 13/Grade 8										
N0003 Recreation Opportunity	85.4	.82	83.0	.81	76.7	.73	79.5	.77	81.9	.82
N0004 Food on Frontier	79.9	.68	83.5	.78	72.1	.67	79.4	.68	75.5	.69
N0005 Dissecting Frog	76.1	.64	80.6	.70	66.1	.56	71.2	.54	71.7	.63
N0006 XYZ Company	93.5	.92	92.6	.87	86.8	.76	86.2	.76	88.5	.80
N0009 Radio Station	87.0	.89	82.0	.79	80.7	.83	85.8	.87	86.0	.89
N0010 Appleby House	75.3	.69	75.4	.75	75.9	.72	78.0	.77	82.5	.84
Age 17/Grade 11										
N0003 Recreation Opportunity	90.8	.93	71.6	.78	76.3	.78	83.7	.84	79.9	.78
N0004 Food on Frontier	93.1	.86	78.9	.69	76.7	.73	85.9	.72	79.7	.73
N0010 Appleby House	89.3	.89	81.1	.81	81.6	.82	88.2	.88	81.4	.82
N0180 Spaceship	89.9	.93	73.2	.75	71.8	.75	82.9	.86	80.8	.81
N0190 Job Application	92.3	.92	85.5	.86	84.6	.83	90.2	.88	90.5	.84
N0210 Bike Lane	84.9	.87	78.2	.76	75.6	.78	83.5	.84	81.5	.83

Table 17-4 (continued)

Percentages of Exact Score Agreement and Interrater Reliability for the Primary Trait Scoring of the Writing Long-Term Trend Assessment Items

NAEP Item	1988 Data (by 1994 Raters) Percent Agreement	1988 Data (by 1994 Raters) Reliability	1994 Data (by 1994 Raters) Percent Agreement	1994 Data (by 1994 Raters) Reliability	1988 Data (by 1996 Raters) Percent Agreement	1988 Data (by 1996 Raters) Reliability	1994 Data (by 1996 Raters) Percent Agreement	1994 Data (by 1996 Raters) Reliability	1996 Data (by 1996 Raters) Percent Agreement	1996 Data (by 1996 Raters) Reliability
Age 9/Grade 4										
N0006 XYZ Company	93.2	.92	94.4	.93	93.3	.94	94.9	.94	97.4	.98
N0009 Radio Station	95.0	.96	94.9	.95	93.9	.95	96.2	.97	96.0	.97
N0010 Appleby House	87.9	.89	90.4	.90	85.9	.87	88.6	.88	94.3	.95
N0076 Flashlight	86.2	.82	81.0	.75	92.5	.92	84.1	.80	93.2	.92
N0147 Plants	93.5	.94	89.4	.90	92.7	.93	90.2	.91	95.9	.96
N0148 Spaceship	86.7	.90	84.0	.87	89.8	.92	87.3	.90	92.9	.96
Age 13/Grade 8										
N0003 Recreation Opportunity	91.4	.88	90.1	.89	90.5	.88	76.7	.74	92.4	.92
N0004 Food on Frontier	84.3	.79	87.6	.84	88.6	.86	75.2	.71	92.4	.91
N0005 Dissecting Frog	84.4	.76	79.3	.71	85.8	.80	61.7	.45	89.3	.89
N0006 XYZ Company	94.1	.92	95.6	.93	96.0	.95	89.2	.80	97.3	.96
N0009 Radio Station	89.5	.90	95.5	.94	89.0	.91	72.1	.75	92.7	.94
N0010 Appleby House	82.6	.80	83.4	.79	89.8	.89	70.4	.61	93.6	.93
Age 17/Grade 11										
N0003 Recreation Opportunity	89.6	.92	82.0	.81	82.5	.84	82.1	.85	91.6	.93
N0004 Food on Frontier	88.1	.74	82.7	.78	85.6	.75	77.3	.80	91.8	.92
N0010 Appleby House	91.3	.89	87.4	.89	84.9	.85	80.2	.81	93.2	.93
N0180 Spaceship	93.0	.92	77.0	.78	85.0	.85	73.7	.77	86.1	.90
N0190 Job Application	93.2	.92	87.1	.84	89.6	.90	77.9	.82	92.8	.94
N0210 Bike Lane	92.2	.92	82.2	.81	81.8	.83	74.2	.75	88.2	.91

Table 17-5

Descriptive Statistics for Writing Prompts, 1996 Writing Long-Term Trend Samples

		Weighted Percentages of Grade-Eligible Examinees in Each Score Category					
Item	**RN**	**0[2]**	**1**	**2**	**3**	**4**	**Mean**
Age 9/Grade 4							
N0006	1103	1.6	54.6	5.9	37.9	—	1.80
N0009	1200	2.6	47.7	35.3	14.4	0.0	1.62
N0010	909	0.8	22.1	53.1	23.9	0.0	2.00
N0076	603	0.9	36.9	51.4	9.9	0.9	1.73
N0147	1205	0.5	17.7	45.4	36.4	—	2.18
N0148	1212	3.4	32.0	36.2	28.0	0.4	1.90
Age 13/Grade 8							
N0003	1315	0.9	52.1	35.3	10.6	1.2	1.59
N0004	1275	1.1	25.1	58.1	15.3	0.4	1.89
N0005	1392	0.8	25.0	50.0	23.5	0.7	1.98
N0006	1357	0.3	18.9	6.1	74.7	—	2.55
N0009	1391	0.4	37.2	44.1	17.7	0.5	1.81
N0010	1250	0.1	7.5	40.1	50.8	1.5	2.46
Age 17/Grade 11							
N0003	1235	1.1	31.7	50.0	16.4	0.7	1.84
N0004	1151	1.5	14.9	60.0	22.3	1.3	2.07
N0010	1130	0.4	10.3	37.0	50.9	1.4	2.43
N0180	1218	5.6	24.6	39.7	28.5	1.6	1.96
N0190	1183	0.9	15.6	19.6	61.1	2.8	2.49
N0210	1251	1.4	32.0	45.3	20.3	1.0	1.88

[2] Omitted and off-task responses are coded as 0. For scaling, these responses are treated as not presented.

17.4 IRT SCALING FOR THE WRITING LONG-TERM TREND ASSESSMENT

This section describes the scaling of the primary trait data from the 1996 writing long-term trend assessment. A listing of the prompts used in scaling at the three grade levels is presented in Table 17-6. Five prompts were used at the fourth-grade level and six prompts were used at each of the eighth- and eleventh-grade levels. Either three or four scoring categories were used in the scaling for each of the prompts. Three prompts (N0006, N0009, and N0147) at the fourth-grade level and two (N0006 and N0009) at the eighth-grade level were scaled with three categories because the frequencies of responses in the fourth category were zero or near zero. All other prompts were scaled with four categories. After examining the pattern of omitted, not-reached, off-task, and illegible responses relative to responses to other prompts, it was decided to treat these responses as missing, because there appeared to be no obvious relationship between writing performance and nonresponse (for whatever reason) to other prompts. Treating such prompts as missing meant that they would not enter into the scaling process. One of the prompts administered in the assessment, "Flashlight," was not administered with any other prompt, and therefore could not be put on the same scale as the other prompts. Hence, this prompt was excluded from scaling and from the number of prompts cited above.

The resulting sample sizes for scaling the long-term trend items are provided in Table 17-6. The 1984 long-term trend point was based on a rescoring of a sample of the 1984 data by the 1988 raters. For details, see Johnson (1990).

When the long-term trend items were administered for the first time in 1984, they were used as part of the 1984 BIB design. By applying the additional information that was obtained from the 1984 design, the long-term trend items for each grade were calibrated together. This task was not straightforward. Due to rater drift, the 1984 original data for long-term trend items had to be rescored in 1988 and not all the booklets were included in the rescoring. Although enough information was captured to calibrate all the fourth-grade items together, this was not the case for the eighth- and eleventh-grade items. There were two non-overlapping groups of items at these two grade levels. Items within the groups were administered to common samples of examinees, but there were no common samples for items between these two groups. This prohibited a direct linking via scaling all items simultaneously. As a result, an additional step was required for these two grade levels.

Age 9/Grade 4 Level. For this level, the generalized partial credit model was used to calibrate, simultaneously, the prompts in the 1994 and 1996 data. This required a single run on the NAEP BILOG/PARSCALE computer program specifying two subpopulations, one for each year.

Age 13/Grade 8 and Age 17/Grade 11 Levels. For each of these two levels, two separate PARSCALE computer runs were conducted, one on each of the two separate groups of prompts discussed above. Like the fourth-grade level, the 1994 and 1996 data were simultaneously scaled using two subpopulations.

Table 17-6

Age/Grade Sample Sizes for Scaling Items Used in Long-Term Trends in Writing Performance[1]

NAEP Item	Age 9/Grade 4						Age 13/Grade 8						Age 17/Grade 11					
	1984 Rescore	1988	1990	1992	1994	1996	1984 Rescore	1988	1990	1992	1994	1996	1984 Rescore	1988	1990	1992	1994	1996
N0006 XYZ Company	603	1398	1679	2023	1488	1393	751	1766	1992	1787	1776	1785	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]
N0009 Radio Station	582	1506	1794	2099	1577	1495	713	1801	2025	1834	1831	1831	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]
N0010 Appleby House	530	1143	1413	1684	1217	1133	674	1658	1848	1681	1681	1651	694	1322	1628	1614	1344	1410
N0147 Plants	709	1604	1833	2213	1708	1552	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]
N0148 Spaceship	664	1508	1765	2076	1587	1513	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]
N0003 Recreation Opportunity	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	598	1758	1962	1729	1739	1737	635	1482	1767	1790	1542	1498
N0004 Food on Frontier	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	731	1748	1951	1735	1749	1680	714	1482	1756	1806	1547	1400
N0005 Dissecting Frogs	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	777	1796	2016	1816	1803	1822	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]
N0180 Space Program	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	713	1464	1776	1777	1496	1449
N0190 Job Application	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	728	1473	1796	1804	1472	1470
N0210 Bike Lane	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	—[2]	748	1495	1823	1801	1536	1547

[1] Omitted and off-task responses were treated as not presented.

[2] The indicated NAEP item was not administered at this age/grade class.

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17.4.1 Item Parameter Estimation Using the Generalized Partial Credit Model

The first step in the scaling process was the estimation of item parameters for the long-term trend items. This item calibration was performed using the BILOG/PARSCALE program described in Chapter 11. Items were calibrated separately for each of the three age/grade groups. Item parameters were estimated using combined data from the assessment years 1994 and 1996, treating each assessment as a sample from a separate subpopulation. In age 13/grade 8 and age 17/grade 11, there were two sets of nonoverlapping items. Each set was scaled separately (see Table 17-7). Therefore, there were five sets of calibrations—one for age 9/grade 4, and two each for age 13/grade 8 and age 17/grade 11. Student weights were used for the calibration. To ensure that each assessment year had a similar influence on the calibration, student weights for 1994 and 1996 examinees were multiplied by a constant in order to adjust them to have the same sum, arbitrarily placed at 1,000. Approximately 1,200-1,800 examinees were present in each assessment year for each item.

Table 17-7

Nonoverlapping Sets of Items for the Writing Long-Term Trend Assessment

Age/Grade	Set	Booklets	Items
9/4	A	51-55	N0006, N0009, N0010, N0147, N0148
13/8	A	51, 52, 54	N0003, N0004
	B	53, 55, 56	N0005, N0006, N0009, N0010
17/11	A	51, 52, 54	N0003, N0004
	B	53, 55, 56	N0010, N0180, N0190, N0210

The final 1994 item parameter estimates were used as starting values. The proficiency distribution of each assessment year was constrained to be normally distributed, although the means and variances differed across assessment years. Calibration was concluded when changes in item parameters became negligibly small (i.e., less than .005). The item parameter estimates appear in Appendix D.

17.5 GENERATION OF PLAUSIBLE VALUES

The generation of plausible values was conducted independently for each set of items within an age/grade level for each of the assessment years. The item parameters from BILOG/PARSCALE, final student weights, item responses, and selected background variables were used with the computer program BGROUP (described in Chapter 11) to generate the values for each age/grade level. The background variables included student demographic characteristics (e.g., race/ethnicity of the student, highest level of education attained by parents), students' perceptions about writing, and student behavior both in and out of school (e.g., amount of television watched daily, amount of homework done each day). Appendix C gives the codings for the conditioning variables for the three age/grade groups. Table 17-8 contains a list of the number of background variables included in conditioning, as well as the proportion of variance accounted for by the conditioning model for each age/grade.

Table 17-8

Proportion of Proficiency Variance Accounted for by the Conditioning Model for the Writing Long-Term Trend Assessment

Age/Grade	Number of ConditioningConstants[2]	Proportion of Variance
9/4	48	0.43
13/8	48	0.55
17/11	48	0.38

[2] Excluding the constant term.

17.6 THE FINAL WRITING LONG-TERM TREND SCALE

The linear indeterminacy of the long-term trend scale was resolved by linking the 1996 trend scales to previous trend scales. For sets within each age/grade, the item parameters from the joint calibration based on data from 1994 and 1996 were used with the 1994 data to find plausible values for the 1996 data. The mean and standard deviation for all of the plausible values were calculated and matched to the mean and standard deviation for all of the plausible values, based on the original analysis of the 1994 data, as given in earlier reports. The transformations that resulted from this matching of the first two moments for the 1994 data are

Age 9/Grade 4: $\theta_{target} = 39.15 \bullet \theta_{calibrated} + 202.21$,

Age 13/Grade 8A: $\theta_{target} = 37.61 \bullet \theta_{calibrated} + 258.92$,

Age 13/Grade 8B: $\theta_{target} = 37.04 \bullet \theta_{calibrated} + 260.29$,

Age 17/Grade 11A: $\theta_{target} = 36.33 \bullet \theta_{calibrated} + 280.48$, and

Age 17/Grade 11B: $\theta_{target} = 34.75 \bullet \theta_{calibrated} + 279.66$,

where θ_{target} denotes values on the final transformed scale and $\theta_{calibrated}$ denotes values on the calibration scale.

As described above, the IRT parameters are estimated, plausible values computed, and final scale transformations established using the age/grade samples. Reporting was done, however, using grade-only samples. Overall summary statistics for the long-term trend grade samples are given in Table 17-9.

Table 17-9

Means and Standard Deviations on the Writing Long-Term Trend Scale

Grade	Assessment Year	All Five Plausible Values Mean	S.D.
4	1984	203.8	36.5
	1988	205.7	42.0
	1990	201.7	41.7
	1992	207.1	38.3
	1994	204.8	38.3
	1996	207.4	38.1
8	1984	266.7	29.5
	1988	263.7	32.4
	1990	256.6	37.5
	1992	274.4	36.3
	1994	265.3	35.9
	1996	263.6	36.4
11	1984	289.7	31.8
	1988	291.3	27.9
	1990	287.1	36.5
	1992	287.3	32.0
	1994	284.6	34.4
	1996	283.0	34.6

17.7 PARTITIONING OF ESTIMATION ERROR VARIANCE

The variance of proficiency means for each age/grade level was partitioned into the part due to the sampling of students and the part due to the latency of proficiency, θ, as described in Chapter 17. These estimates are given in Table 17-10 (for stability, the estimates of the between-imputation variance, B, in Equation 11.9 are computed based on 100 imputations). More detailed information is available for gender and race/ethnicity subgroups in Appendix E.

Table 17-10

Estimation Error Variance and Related Coefficients
for the Writing Long-Term Trend Assessment

Age/Grade	Total Estimation Error Variance	Proportion of Variance due to . . . Student Sampling	Latency of θ
9/4	0.94	0.89	0.11
13/8	0.95	0.89	0.11
17/11	1.24	0.94	0.06

Chapter 18

CONVENTIONS USED IN HYPOTHESIS TESTING AND REPORTING NAEP RESULTS[1]

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18.1 OVERVIEW

Results for the 1996 NAEP Assessments were disseminated in several different reports: the *NAEP 1996 Mathematics Report Card for the Nation and the States*, the *NAEP 1996 Science Report Card for the Nation and the States*, *NAEP 1996 Trends in Academic Progress*, *Cross-State Data Compendium from the NAEP 1996 Mathematics Assessment*, *Cross-State Compendium from the NAEP 1996 Science Assessment*, and, distributed only in electronic form, six sections of summary data tables for each report. These reports are published on the NCES/NAEP website *http://nces.ed.gov/naep*. Several other reports based on 1996 NAEP data will be forthcoming.

The *NAEP 1996 Mathematics Report Card for the Nation and the States* and the *NAEP 1996 Science Report Card for the Nation and the States* highlight key assessment results for the nation and summarize results across the jurisdictions participating in the assessments. These reports contain composite scale score results (scale score means, etc.) for the nation, for each of the four regions of the country, and for public-school students within each jurisdiction participating in the State Assessment[2], both overall and by primary reporting variables. The seven key reporting variables (referred to here as primary reporting variables) are gender, race/ethnicity, level of parents' education, Title I participation, eligibility for free or reduced cost school lunch, type of location, and type of school (public, Catholic schools, other religious schools, and other private schools). For public-school students, scale score means were reported for a variety of other subpopulations defined by responses to items from the student, teacher, and school questionnaires and by school and location demographic variables provided by Westat, Inc.[3] Upcoming reports will include estimates of scale score means and selected percentiles for specific subgroups of students of interest in each report.

The report *NAEP 1996 Trends in Academic Progress* provides a look at NAEP results for Science, Mathematics, Reading, and Writing since the first NAEP assessments of those subjects in 1969-70. This report includes scale score results for the nation overall and by gender, race/ethnicity, gender and race/ethnicity, region, level of parents' education and type of school (public and nonpublic). It also provides percentages of students in categories defined by subject specific background variables (such as students who reported having experimented with living plants), along with their average scale scores. The report contains trends in average scale scores by quartile and percentages of students performing at or above selected performance levels. An additional report gives data for the mechanics of writing long-term trend.

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[1] Spencer S. Swinton played a role in making decisions about hypothesis testing methods and procedures and worked with David S. Freund who implemented many of the methods and procedures in computer programs. Nancy L. Allen contributed to the current version of this chapter.

[2] Further technical documentation for the State Assessments appears in the *Technical Report of the NAEP 1996 State Assessment Program in Mathematics* and the *Technical Report of the NAEP 1996 State Assessment Program in Science.*

[3] Some of these variables were used by Westat, Inc., in developing the sampling frame for the assessment and in drawing the sample of participating schools.

The third type of report consists of a number of data compendia. Two of these are entitled the *Cross-State Data Compendium from the NAEP 1996 Mathematics Assessment* and the *Cross-State Data Compendium from the NAEP 1996 Science Assessment*. Like the *Report Cards*, the *Compendia* report results for the nation and for all of the jurisdictions participating in the State Assessment. The *Compendia* contain most of the tables included in the *Report Cards* plus tables that provide composite scale results for a large number of secondary reporting variables (e.g., amount of homework, teacher preparation).

The fourth type of summary report is an electronically-delivered collection of summary data tables that contain detailed breakdowns of the science scale score data for each sample according to the responses to the student, teacher, and school questionnaires for the public-school, nonpublic-school, and combined populations as a whole and for important subgroups of the public-school population, as defined by the primary reporting variables. There are six sections in each collection of summary data tables:

> *The Distribution Data Section* provides selected composite-scale and science subscale percentiles for the public-school, nonpublic-school, and total populations and for the major demographic subgroups of the national school population.
>
> *The Student Questionnaire Section* breaks down the composite scale score data according to the students' responses to questions in the three student questionnaires (common core, subject-specific background, and motivational section) included in the assessment booklets.
>
> *The Teacher Questionnaire Section* breaks down the composite scale score data according to the teachers' responses to questions in teacher questionnaires, where they are available.
>
> *The School Questionnaire Section* breaks down the composite scale score data according to the principals' (or other administrators') responses to questions in the school characteristics and policies questionnaire.
>
> *The Scale Section* breaks down the scale score data for the mathematics content strands or the fields of science according to selected items (such as the amount of science homework done per day) from the questionnaires.
>
> *The Item Section* provides the response data (percent of students choosing each option) for each cognitive item in the assessment.

The production of these reports required many decisions about a variety of data analysis and statistical issues. For example, certain categories of the reporting variables contained limited numbers of examinees. A decision was needed as to what constituted a sufficient sample size to permit the reliable reporting of subgroup results, and which, if any, estimates were sufficiently unreliable to need to be "flagged" as a caution to readers. As a second example, the performance for subgroups of students were compared. A number of inferential rules, based on logical and statistical considerations, had to be developed to ensure that conclusions are adequately supported by the data from the assessment. Practical comparison procedures were required to control for Type I errors without paying too large a penalty with respect to the statistical power for detecting real and substantively interesting differences. For most tests, the number of related tests was not so large that the Bonferroni test (Hochberg, 1988) exacted too large a penalty in power in exchange for protection from Type I error. For sets of comparisons with very large numbers of related tests, such as comparing a state to all other states, a new multiple comparison criterion, False Discovery Rate or FDR (Benjamini & Hochberg, 1994), was implemented. FDR controls the *rate* of false rejections (e.g., five false rejections per 100 rejections), rather than controlling the probability of one such error (Familywise Error Rate, or FWE), as the Bonferroni procedure does.

The purpose of this chapter is to document the major conventions and statistical procedures used in generating the *Report Cards*, *NAEP 1996 Trends*, the *Data Compendia*, and the summary data tables. Additional details about procedures relevant to the *Report Card* and *Cross-State Data Compendia* can be found in the text and technical appendices of those reports.

18.2 MINIMUM SCHOOL AND STUDENT SAMPLE SIZES FOR REPORTING SUBGROUP RESULTS

In all of the reports, estimates of quantities such as composite and scale score means and percentages of students indicating particular levels of background variables (as measured in the student, teacher, and school questionnaires) are reported for the population of students in each grade. These estimates are also reported for certain key subgroups of interest as defined by primary NAEP reporting variables. Where possible, NAEP reports results for gender, for five racial/ethnic subgroups (White, Black, Hispanic, Asian American/Pacific Islander, and American Indian/Alaskan Native), three types of locations (central cities, urban fringes/large towns, rural/small town areas), four levels of parents' education (did not finish high school, high school graduate, some college, college graduate), Title 1 participation, eligibility for the free or reduced-cost school lunch component of the National School Lunch Program, and type of school. However, for some regions of the country and sometimes for the nation as a whole, school and/or student sample sizes were too small for one or more of the categories of these variables to permit accurate reporting.

A consideration in deciding whether to report an estimated quantity is whether the sampling error is too large to permit effective use of the estimates. A second, and equally important, consideration is whether the standard error estimate that accompanies a statistic is itself sufficiently accurate to inform potential readers about the reliability of the statistic. The precision of a sample estimate (be it sample mean or standard error estimate) for a population subgroup from a three-stage sample design (the one used to select samples for the national assessments) is a function of the sample size of the subgroup and of the distribution of that sample across first-stage sampling units (i.e., PSUs in the case of the national assessments). Hence, both of these factors were used in establishing minimum sample sizes for reporting.

Here a decision was reached to report subgroup results only if the student sample size exceeded 61.[5] A design effect of two was assumed for this decision, implying a sample design-based variance twice that of simple random sampling. This assumption is consistent with previous NAEP experience (Johnson & Rust, 1992). In carrying out the statistical power calculations when comparing a subgroup to the total group, it was assumed that the total population sample size is large enough to contribute negligibly to standard errors. Furthermore, it was required that the students within a subgroup be adequately distributed across PSUs to allow for reasonably accurate estimation of standard errors. In consultation with Westat, a decision was reached to publish only those statistics that had standard error estimates based on five or more degrees of freedom. The same minimum student and PSU sample size restrictions were applied to proportions and to comparisons of percentages or proportions as well as average scale scores and comparisons of average scale scores.

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[5] This number was obtained by determining the sample size necessary to detect an effect size of 0.5 with a probability of 0.8 or greater.

18.3 IDENTIFYING ESTIMATES OF STANDARD ERRORS WITH LARGE MEAN SQUARED ERRORS

As noted above, standard errors of average scale scores, proportions, and percentiles play an important role in interpreting subgroup results and in comparing the performances of two or more subgroups. The jackknife standard errors reported by NAEP are statistics whose quality depends on certain features of the sample from which the estimate is obtained. In certain cases, the mean squared error[6] associated with the estimated standard errors may be quite large. This result typically occurred when the number of students upon which the standard error is based is small or when this group of students comes from a small number of participating PSUs. The minimum PSU and student sample sizes that were imposed in most instances suppressed statistics where such problems existed. However, the possibility remained that some statistics based on sample sizes that exceed the minimum requirements had standard errors that were not well estimated. Therefore, in the reports, estimated standard errors for published statistics that are themselves subject to large mean squared errors are followed by the symbol "!".

The magnitude of the mean squared error associated with an estimated standard error for the mean or proportion of a group depends on the coefficient of variation (*CV*) of the estimated size of the population group, denoted as $\hat{N}$ (Cochran, 1977, Section 6.3). The coefficient of variation is estimated by:

$$CV(\hat{N}) = \frac{SE(\hat{N})}{\hat{N}}$$

where $\hat{N}$ is a point estimate of N and $SE(\hat{N})$ is the jackknife standard error (described in Chapter 10 of this report) of $\hat{N}$.

Experience with previous NAEP assessments suggests that when this coefficient exceeds 0.2, the mean squared error of the estimated standard errors of means and proportions based on samples of this size may be quite large. (Further discussion of this issue can be found in Johnson & Rust, 1992.) Therefore, the standard errors of means and proportions for all subgroups for which the coefficient of variation of the population size exceeds 0.2 are marked as described above. In the *Report Cards*, *NAEP Trends*, the *Data Compendia*, and the summary data tables, statistical tests involving one or more quantities that have standard errors, confidence intervals, or significance tests so flagged should be interpreted with caution.

18.4 TREATMENT OF MISSING DATA FROM THE STUDENT, TEACHER, AND SCHOOL QUESTIONNAIRES

As previously described, responses to the student, teacher, and school questionnaires played a prominent role in all reports. Although the return rate on all three types of questionnaire was high,[7] there were missing data for each type of questionnaire.

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[6] The mean squared error of the estimated standard error is defined as $\mathcal{E}[\hat{S} - \sigma]^2$, where $\hat{S}$ is the estimated standard error, σ is the "true" standard error, and $\mathcal{E}$ is the expectation, or expected value operator.

[7] Information about survey participation rates (both school and student), as well as proportions of students excluded by each jurisdiction from the assessment, is given in Appendix B. Sampling adjustments intended to account for school and student nonresponse are described in Chapter 7.

The reported estimated percentages of students in the various categories of background variables, and the estimates of the average scale score of such groups, were based on only those students for whom data on the background variable were available. In the terminology of Little and Rubin (1987), the analyses pertaining to a particular background variable presented in the reports are contingent on the assumption that the data are missing completely at random.[8]

The estimates of proportions and proficiencies based on "missing-completely-at-random" assumptions are subject to potential nonresponse bias if, as may be the case, the assumptions are not correct. The amount of missing data was small (usually, less than 2%) for most of the variables obtained from the student, school, and teacher questionnaires. For analyses based on these variables, reported results are subject to little, if any, nonresponse bias. However, for particular background items from the student, school, and teacher questionnaires, the level of nonresponse was somewhat higher. As a result, the potential for nonresponse bias in the results of analyses based on this latter set of background items is also somewhat greater. Background items for which more than 10 percent of the returned questionnaires were missing are identified in the questionnaire sections (as specified at the beginning of this chapter) of the summary data tables. Again, results for analyses involving these background variables should be interpreted with caution.

To analyze the relationships among teachers' questionnaire responses and their students' achievement, each teacher's questionnaire had to be matched to the students who were taught by that teacher. If a student could not be matched to a teacher, all teacher questionnaire responses are missing for that student. The percentages of students that were matched to teacher questionnaires in each sample for which a teacher questionnaire was administered are reported in the subject area Chapters 12 and 13. Lower percentages of students with teacher questionnaire data indicate that there is less certainty about results for variables from the teacher questionnaire. Note that these match rates do not reflect the additional missing data due to item-level nonresponse. The amount of additional item-level nonresponse in the returned teacher questionnaires can be found in the summary data tables.

18.5 HYPOTHESIS TESTING CONVENTIONS

18.5.1 Comparing Means and Proportions for Different Groups of Students

Many of the group comparisons explicitly commented on in the reports involved mutually exclusive sets of students. Examples include comparisons of the average scale score for male and female students, White and Hispanic students, students attending schools in central city and urban fringe/large town locations, students who reported watching six or more hours of television each night and students who report watching less than one hour each night.

The text in the reports indicate that means or proportions from two groups were different only when the difference in the point estimates for the groups being compared was statistically significant at an approximate simultaneous α level of 0.05. An approximate procedure was used for determining statistical significance NAEP staff judged to be statistically defensible, as well as being computationally tractable. Although all pairs of levels within a variable were tested and reported in the summary data tables, some text within the reports was developed for only a subset of these comparisons although the family size was maintained at that of the original tests. For example, text was included in the reports to compare the majority ethnic group and each minority group, but text for all possible comparisons of groups may not have been included.

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[8] The mechanism generating the missing data is independent of both the response to the particular background items and the scale score.

The procedure used to make statistical tests is described in the following paragraphs. This procedure was used in all cases except when comparisons were made with students assessed in assessment years for which average scale scores were extrapolated as part of the long-term trend analyses. In those cases, z-tests comparing the test statistics to the appropriate value from the standard normal distribution was used.

Let A_i be the statistic in question (e.g., a mean for group i) and let S_{A_i} be the jackknife standard error of the statistic. The text in the reports identified the means or proportions for groups i and j as being different if:

$$\frac{|A_i - A_j|}{\sqrt{S^2_{A_i}\ (A_i) + S^2_{A_j}\ (A_j)}} \geq T_{\frac{.05}{2c}}$$

where T_α is the $(1 - \alpha)$ percentile of the t distribution with degrees of freedom, df, as estimated below, and c is the number of related comparisons being tested. See the following section (Section 18.5.2) for a more specific description of multiple comparisons. In cases where group comparisons were treated as individual units, the value of c was taken as 1, and the test statistic was approximately equivalent to a standard two-tailed t-test for the difference between group means or proportions from large independent samples with the α level set at 0.05. When c is not 1, this test is based on the Bonferroni procedure described in Hochberg (1988). The degrees of freedom of this t-test is defined by a Satterthwaite (Johnson & Rust, 1992) approximation as follows:

$$df = \frac{\left(\sum_{k=1}^{N} S^2_{A_k}\right)^2}{\sum_{k=1}^{N} \frac{S^4_{A_k}}{df_{A_k}}}$$

where N is the number of subgroups involved, and df_{A_k} is as follows:

$$df_{A_k} = \left(3.16 - \frac{2.77}{\sqrt{m}}\right)\left[\frac{\left(\sum_{j=1}^{m}(t_{j_k} - t_k)^2\right)^2}{\sum_{j=1}^{m}(t_{j_k} - t_k)^4}\right]$$

where m is the number of replicates, t_j is the j^{th} replicated estimate for the mean of a subgroup, and t is the estimate of the subgroup mean using the overall weights and the first plausible value.

The procedures in this section assume that the data being compared are from independent samples. Because of the sampling design in which PSUs, schools, and students within school are randomly sampled, the data from mutually exclusive sets of students may not be strictly independent. Therefore, the significance tests employed are, in many cases, only approximate. As described in Section

10.4, another procedure, one that does not assume independence, could have been conducted. However, that procedure is computationally burdensome. A comparison of the standard errors using the independence assumption and the correlated group assumption was made using NAEP data. The estimated standard error of the difference based on independence assumptions was approximately ten percent larger than the more complicated estimate based on correlated groups. In almost every case, the correlation of NAEP data across groups was positive. Because, in NAEP, significance tests based on assumptions of independent samples are only somewhat conservative, the approximate procedure was used for most comparisons.

The procedures described above were used for testing differences of both means *and* nonextreme percentages. The approximation for the test for percentages works best when sample sizes are large, and the percentages being tested have magnitude relatively close to 50 percent. Statements about group differences should be interpreted with caution if at least one of the groups being compared is small in size and/or if "extreme" percentages are being compared. Differences in percentages were treated as involving "extreme" percentages if for either percentage, P:

$P < P_{lim} = \dfrac{200}{N_{EFF} + 2}$, where the effective sample size is $N_{EFF} = \dfrac{P(100 - P)}{(SE_{JK})^2}$, and SE_{JK} is the jackknife standard error of P. Similarly, at the other end of the 0 - 100 scale, a percentage is deemed extreme if $100 - P < P_{lim}$. In either extreme case, the normal approximation to the distribution is a poor approximation, and the value of P was reported, but no standard error was estimated and hence no significance tests were conducted.

18.5.2 Multiple Comparison Procedures

Frequently, groups (or families) of comparisons were made and were presented as a single set. The appropriate text, usually a set of sentences or a paragraph, was selected for inclusion in a report based on the results for the entire set of comparisons. For example, some reports contain a section that compared average scale scores for a predetermined group, generally the majority group (in the case of race/ethnicity, for example, White students) to those obtained by other minority groups. The entire set of tests was presented in the summary data tables. For families of comparisons like these, a Bonferroni procedure (Miller, 1966), controlling the Familywise Error Rate (FWE), was used. This procedure defines the value of T_{α}, as in the previous section, where c is the number of contrasts in the set. In the race/ethnicity example, c was taken to be the number of minority groups meeting minimum sample size requirements, and each statistical test was consequently carried out at an α level of $0.05/c$.

However, in an attempt to gain greater power, two separate definitions of family size were employed for comparisons in two-way tables. For n levels of a control variable (e.g., ethnicity) and m levels of a comparison variable (e.g., number of hours of homework), the standard Bonferroni family size of $n \times m \times (m-1)/2$ was used. In addition, when the $m \times (m-1)/2$ marginal tests yielded a significant difference for a pair of categories of the comparison variable, the n levels of the control variable corresponding to that pair of categories were tested with a family size of n. Significance was reported if either definition of family size met the criterion.

Further, in the *Report Card* and summary data tables, two-way interactions were tested directly for some variables. The tests for an $m \times n$ table were t-tests using a family size $n \times (n-1) \times m \times (m-1)/4$. In these cases, a modification due to Hochberg of the standard Bonferroni procedure was employed, in which probabilities associated with outcomes are ordered, and α is divided by an integer which increases from 1 to the family size as successively smaller probabilities are tested. More formally, the Hochberg Stagewise Procedure (Hochberg, 1988) is defined as follows:

Let q be the number of significance tests made (the family size) and let $P_1 \leq P_2 \leq \ldots \leq P_m$ be the ordered significance levels for the q tests. Let α be the combined significance level. The Hochberg procedure compares P_q with α, P_{q-1} with $\alpha/2, \ldots, P_j$ with $\alpha/(q-j+1)$, stopping comparisons with the first j such that $P_j < \alpha/(q-j+1)$. All tests associated with $P_1, \ldots, P_j$ are declared significant; all tests associated with $P_{j+1}, \ldots, P_q$ are declared nonsignificant.

To compare a jurisdiction in a State Assessment with the nation and all other participating jurisdictions, as many as 46 different comparisons need to be computed. This is done in the comparisons of overall scale score maps in the State Assessment reports and in the comparisons of short-term trends in mathematics achievement in the *Mathematics Report Card*. A potentially more powerful multiple comparison procedure was used to judge significance in this case. The procedure, described by Benjamini and Hochberg (1994), was the procedure chosen. Unlike the Bonferroni procedure that controls the FWE, the procedure described by Benjamini and Hochberg (1994) controls the expected proportion of falsely rejected hypotheses among all rejections (FDR). For example, at the 0.05 level, for every 100 rejections of the null hypothesis, the procedure ensures that no more than five will be expected to be false. Note that control of the FDR is a less conservative type of error control than that of the FWE. Simulations have shown that "the FDR is controlled at level α for the dependent tests involved in pairwise comparisons as well as for independent tests" (Shaffer, 1994).

The Benjamini and Hochberg application of the False Discovery Rate (FDR) criterion can be described as follows. Let q be the number of significance tests made and let $P_1 \leq P_2 \leq \ldots \leq P_q$ be the ordered significance levels of the q tests, from lowest to highest probability. Let α be the combined significance level desired, usually 0.05. The procedure will compare P_q with α, P_{q-1} with $\alpha(q-1)/q, \ldots, P_j$ with $\alpha j/q$, stopping the comparisons with the first j such that $P_j \leq \alpha j/q$. All tests associated with $P_1, \ldots, P_j$ are declared significant; all tests associated with $P_{j+1}, \ldots, P_q$ are declared nonsignificant.

18.5.3 Linear and Quadratic Tests of Trends

Tests of significance designed to identify consistent patterns of trend data are available and, although they are more complex, they provide more power to identify those specific patterns than a series of t- or z-tests would provide.

One such set of tests of significance is the test of linear and test of quadratic trends applied to the long-term trend data for the nation and selected subpopulations. The purpose of this first set of general tests was to determine whether the results of the series of assessments in a given subject could be generally characterized as increasing or decreasing, and whether the results have steadily increased (or decreased) over the time period of interest. Simple curvilinear (i.e., quadratic) relationships capture more complex patterns. For example, one possible pattern is to have initial score declines over part of the time period followed by score increases in more recent assessments. Another possible pattern is to have a sequence of several assessments in which scores increased followed by a period of relative stable performance. These examples are two, but not all, of the simple curvilinear relationships that were tested.

The linear and quadratic components of the trend in average scale scores for a given subject area and age group were estimated by applying two sets of contrasts to the set of average scale scores by year. The linear component of the trend was estimated by the sum $b_1 = \Sigma c_j x_j$, where the x_j are the average scale scores by year and the c_j are defined such that b_1 corresponds to the slope of an unweighted regression of the average scale scores on the assessment year. In other words,

$$c_j = \frac{y_j - \frac{1}{N}\sum_i y_i}{\sum_k (y_k - \frac{1}{N}\sum_i y_i)^2}$$

where y_j represents an assessment year. The quadratic component was estimated by the sum $b_2 = \Sigma d_j x_j$ in which the d_j are formally orthogonal to the c_j and are defined such that b_2 is the quadratic term in the unweighted regression of the average scale scores on the assessment year and the square of the assessment year. In other words,

$$d_j = \frac{h_j}{\sum_i h_i^2}$$

where

$$h_j = (y_j^2 - \frac{1}{N}\sum_i y_i^2) - \left[\sum_k c_k (y_k^2 - \frac{1}{N}\sum_i y_i^2)\right] \bullet (y_j - \frac{1}{N}\sum_i y_i)$$

Both c_j and d_j match expected linear quadratic contrasts in common texts *when the years are equally spaced through time* (Winer, 1962/1971). The statistical significance of b_1 and b_2 was evaluated by comparing each estimate to its estimated standard error. The standard error of b_1 was estimated as the square root of the sum $\sum c_j^2 SE_j^2$, in which SE_j is the estimated standard error of x_j. The estimated standard error of the b_2 was analogously defined.

The linear and quadratic trend tests allow statements to be made about results across assessment years in a more powerful way than is possible if results for each year had been compared to those of every other year, using a multiple-comparison procedure such as the Bonferroni method. These tests do not control the overall Type I error rate when they are applied to several related subgroups, such as the students in each region of the country. For this reason, the Bonferroni method for controlling Type I error was used when the trends for related subgroups were tested. For example, when tests were conducted for linear trend for the separate race/ethnicity groups (i.e., White, Black, and Hispanic), these tests were treated as a single family of comparisons of size 3. The significance level for each of the separate tests was adjusted by the Bonferroni procedure to yield a family-wise error rate of .05.

18.5.4 Comparing Proportions Within a Group

Certain analyses involved the comparison of proportions. One example was the comparison of the proportion of students who reported that a parent graduated from college to the proportion of students who indicated that their parents did not finish high school to determine which proportion was larger. There are other such proportions of interest in this example, such as the proportion of students with at least one parent graduating from high school but neither parent graduating from college. For these types of analyses, NAEP staff determined that the dependencies in the data could not be ignored.

Unlike the case for analyses of the type described in Section 18.5.1, the correlation between the proportion of students reporting a parent graduated from college and the proportion reporting that their parents did not finish high school is likely to be negative and large. For a particular sample of students, it is likely that the higher the proportion of students reporting "at least one parent graduated from college" is, the lower the proportion of students reporting "neither parent graduated from high school" will be. A negative dependence will result in underestimates of the standard error if the estimation is based on independence assumptions (as is the case for the procedures described in Section 18.5.1). Such underestimation can result in an unacceptably large number of "nonsignificant" differences being identified as significant.

The procedures of Section 18.5.1 were modified for analyses that involved comparisons of proportions within a group. The modification involved using a jackknife method for obtaining the standard error of the difference in dependent proportions. The standard error of the difference in proportions was obtained by first obtaining a separate estimate of the difference in question for each jackknife replicate, using the first plausible value only, then taking the standard deviation of the set of replicate estimates as the estimate. The procedures used for proportions within a group differed from the procedures of Section 18.5.1 only with respect to estimating the standard error of the difference; all other aspects of the procedures were identical.

Chapter 19

STATISTICAL SUMMARY OF THE 1996 NAEP SAMPLES[1]

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19.1 INTRODUCTION

The analysis of the 1996 NAEP data has resulted in the production of thousands of tables presenting estimates of the proficiency of students, and various subgroups of students, in American schools. This chapter provides a statistical summary of the 1996 NAEP national samples. The chapter assumes a general familiarity with the structure of NAEP as summarized in the Introduction and in the overviews presented in Chapters 1 and 9. Similar results for the state samples appear in the data compendia for the state mathematics and science assessments.

Two of the many types of NAEP results are presented here:

1. the results of the instrument development process, including the sizes of the item pools and numbers of booklets; and

2. the results of the sampling process, including the numbers of students in each sample by selected subgroups.

19.2 MEASUREMENT INSTRUMENTS

For the 1996 assessment, 79 different assessment booklets and questionnaires were printed for age class 9, 80 for age class 13, and 81 for age class 17. These instruments are shown by age level and type in Table 19-1.

The item pool contributing to all main and long-term trend booklets is described in Table 19-2. In general, there are two types of items, cognitive and noncognitive. The cognitive items are developed to measure proficiency in particular subject areas, such as reading and mathematics. Cognitive items may be constructed-response or multiple-choice. The noncognitive items are usually questions about the student's or teacher's backgrounds and perceptions but may also probe other areas, such as school policies or teaching methods. Because many items were used at more than one age class, the total number of items in an item pool is not the sum of the item pools used for the three age classes. However, results for cognitive items that were common across two or three age classes were not compared, due to a NAEP policy of within grade scaling.

The SD/LEP Student Questionnaires, Teacher Questionnaires, and School Characteristics and Policies Questionnaires contained only noncognitive questions. The number of items in the noncognitive pools is the same as the number of items in the questionnaires. More information about the instruments that were developed is provided in Chapters 2 and 4.

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[1] Bruce A. Kaplan was responsible for the text, specifying the tables, and coordinating table production. Shuyi Hua produced most of the tables in this chapter. David Freund's advice was invaluable in the production of this chapter.

19.3 SAMPLE CHARACTERISTICS

In this section, the characteristics of the final reporting NAEP samples are described. The process by which the samples were selected is discussed in Chapter 3.

In the 1996 main assessment, NAEP contacted 2,267 schools (2,263 original and 4 replacements), of which 1,791 contributed data to the assessment. The disposition of these schools is shown in Table 19-3. Some of the schools were unwilling to cooperate; others were believed to be eligible from the sampling frame, but were not. The cooperation rate is calculated as the sum of cooperating schools and the schools that were found to have no eligible students divided by the same sum plus the schools that refused or were from districts that refused to cooperate.

Table 19-3 also shows the number of schools in several categories: region of the country (Northeast, Southeast, Central, West), school type (public, nonpublic, Catholic, Bureau of Indian Affairs, Department of Defense Education Activity), type of location, number of teachers, and number of students.

For the 1996 long-term trend studies, NAEP contacted 856 schools (844 original and 12 replacements), of which 681 contributed data to the various trend assessments. Table 19-4 supplies the same information for the schools assessed for the long-term trend studies that Table 19-3 supplies for the main assessment schools.

The numbers of respondents to the teacher questionnaires are summarized in Table 19-5. The first column in this table includes the number of teachers who responded, by grade and subject area. The second column is the number of students who were not linked to teachers. The third column is the number of students linked to teachers, but not specific classes of these teachers (for eighth grade) or teachers who did not answer classroom information (for fourth grade). The last column is the number of students linked to their teachers and their specific classes.

NAEP is administered in units called assessment sessions. If the number of students attending an assessment session is fewer than a predetermined number, the students missing from the session are assigned to a makeup session and then assessed. Table 19-6 shows the number of regular and makeup sessions in 1996 NAEP by age class for the main and long-term trend samples. Altogether, 103,814 assessed and excluded students were involved in the 1996 NAEP.

Tables 19-7 through 19-9 display the distribution of the students assessed in the cross-sectional NAEP assessment in several basic categories: gender, racial/ethnic grouping, region of the country, parental education, type of location, school type, and modal age. These data are presented for assessed students in the mathematics main and estimation samples in Table 19-7, the mathematics theme and advanced samples in Table 19-8, and the science main and advanced samples in Table 19-9. Tables 19-10, 19-11, and 19-12 provide equivalent information, respectively, for excluded students.

Tables 19-13, 19-14, and 19-15 display the distribution of students assessed in the long-term trend reading and writing assessment for several basic categories: gender, racial/ethnic grouping, region of the country, parental education, type of location, and school type.

There is one table for each age/grade. The tables have four columns:

- eligible by age, which means that the students were in an appropriate age group;
- eligible by grade, which means that the students were in an appropriate grade;
- eligible by age and by grade, which means that the students were of both an appropriate age and appropriate grade; and
- eligible by age or by grade, which is the total number of students for whom data were collected.

Tables 19-16, 19-17, and 19-18 provide similar information for the long-term trend science and mathematics assessment. Note that since these are age-only samples, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible. Tables 19-19 through 19-24 enumerate the excluded students across the various long-term trend samples.

19.4 POPULATION ESTIMATES

The 1996 NAEP samples were designed for estimating the size and attributes of a number of different populations of students. The estimation procedures use sampling weights, developed by Westat, Inc., that are associated with the members of the sample (see Chapter 3). In this chapter, all estimates of population parameters are calculated using these sampling weights. Note these estimates are for the reporting samples (see Chapter 3 for an explanation of the reporting and modular samples).

The sum of the initial weights for a given sample is an estimate of the number of students who are in the population represented by the sample. In other words, the sum of the initial weights is taken as the estimated population size. In analyses, however, this sum of weights was rescaled to sum to the sample size. For example, in Table 19-25, the estimated number of fourth graders in the nation is 3,711,786, as estimated from the main mathematics sample, as opposed to the 6,627 students in the sample given in Table 19-7.

Due to design considerations the main assessment was divided into subsamples, and were administered, and therefore weighted, independently, so that the sum of the initial weights for each subsample estimates the population size. The subsamples for mathematics were main, estimation, theme and advanced; for science, the subsamples were main and advanced.

Note that the samples for the main (cross-sectional) assessment are grade-only samples, while reading and writing long-term trend are grade and age samples. The samples for the mathematics and science long-term trend are age-only samples. The sum of the initial weights of the excluded students estimates the number of ineligible students at the respective age/grade levels.

In most cases, the number of students in an age/grade combination is not of interest; a researcher will be interested in estimating the number of students at either a grade or an age level. For the samples that contain both grade- and age-eligible students, an estimate of the total number of students at an age level can be made by summing the initial weights of only the age-eligible students and adding the corresponding sample of age-eligible excluded students' initial weights. An estimate of the total number of students in a grade sample can be made by summing the initial weights of grade-eligible students plus the initial weights of grade-eligible students from the appropriate excluded student sample.

Tables 19-25 to 19-42 show the sizes of the estimated populations of assessable students and the weighted percentages for the NAEP reporting categories of gender, race/ethnicity, region of the country, parents' education level, type of location, school type and modal age. The estimated subpopulation percentages for the cross-sectional samples are shown in Tables 19-25 through 19-30. Tables 19-31 to 19-36 show the same information for the long-term trend samples. In a similar manner, Tables 19-37 to 19-42 show the estimated total population of excluded students and the weighted percentages by demographic subgroups (data about parents' education level is not collected for excluded students and therefore not reported; data about reasons for exclusion are included instead).

In previous years, this chapter also provided several tables showing selected proficiency results for assessed students, as an aid to readers who are interested in the estimates of proficiency that led to the interpretive results provided in the NAEP subject area reports. These tables are no longer included in this report. Instead, readers are encouraged to take advantage of the electronic version of these results, in the form of thousands of summary data tables computed to analyze the 1996 data. The summary data tables are available both on CD-ROM and via the World-Wide Web at http://nces.ed.gov/naep.

Table 19-1

Measurement Instruments Developed for 1996 NAEP

	Age Class		
Student Assessment Booklets	**9**	**13**	**17**
Total Number of Cross-Sectional (MAIN)	66[1]	67[1]	70
Mathematics	29[1]	30[1]	30
Main	26[1]	26[1]	26
Estimation	1	1	1
Theme	2	2	2
Advanced[2]	—	1	1
Science	37	37	40
Main	37	37	37
Advanced[3]	—	—	3
Total Number of Long-Term Trend	9	9	8
Reading and Writing	6	6	6
Mathematics and Science	3	3	2
Total Number of Questionnaires	4	4	3
Excluded Students (Long-Term Trend only)	1	1	1
SD/LEP (Cross-Sectional (main) only)	1	1	1
Teacher	1	1	0
School	1	1	1
Total Number of Assessment Instruments	79[1]	80[1]	81

[1] A bilingual book was also used, but not counted as a separate book for this table.

[2] No advanced mathematics booklets were administered to age/class 9.

[3] No advanced science booklets were administered to age/class 9 or 13.

Table 19-2

Number of Items Administered, by Sample and Age Class

	Age Class			
	9	13	17	Distinct Items
COMMON BACKGROUND				
Cross-Sectional (Main Math)	24	26	36	42
Cross-Sectional (Main Science)	24	26	36	45
Reading and Writing Long-Term Trend	37	34	48	48
Math and Science Long-Term Trend	28	30	48	58
MATH MAIN				
Background	25	31	44	56
Cognitive — Main	144	178	183	358
Cognitive — Estimation	31	32	38	76
Cognitive — Theme	14	22	18	45
Cognitive — Advanced	0	22	22	44
Motivation	5	5	5	5
SCIENCE MAIN				
Background	39	42	53	68
Cognitive — Main	141	194	190	439
Cognitive — Advanced	0	0	66	66
Motivation	5	5	5	5
LONG-TERM TREND				
Reading Background	40	42	78	81
Reading Cognitive	105	108	96	193
Writing Background	53	65	65	77
Writing Cognitive	6	6	6	12
Mathematics Background	3	29	39	49
Mathematics Cognitive	68	96	94	184
Science Background	16	29	29	45
Science Cognitive	63	83	82	180
SD/LEP STUDENT QUESTIONNAIRE	114	114	114	58
MATH TEACHER QUESTIONNAIRE				
Teacher Background	77	0	59	79
Math Background	17	17	22	36
Math Classroom	40	49	57	96
SCIENCE TEACHER QUESTIONNAIRE				
Teacher Background	77	59	0	79
Science Background	14	13	0	14
Science Classroom	59	59	0	59
SCHOOL QUESTIONNAIRE	100	105	127	196

Table 19-3

School Characteristics in Main Samples (All Samples)

	Grade 4	Grade 8	Grade 12	Total
TOTAL ORIGINAL SAMPLE	723	761	779	2,263
Cooperating	604	592	591	1,787
No Eligibles Enrolled	20	42	28	90
School Refused	99	127	160	386
COOPERATION RATE	86	83	79	83
COOPERATING REPLACEMENTS FOR REFUSALS	1	1	2	4
TOTALS				
Cooperating Schools	605	593[1]	593[1]	1,791
Completed Questionnaires	605	594[1]	595[1]	1,794
REGION				
Northeast	130	126	123	379
Southeast	134	133	151	418
Central	165	163	145	473
West	176	170	174	520

[1] Occasionally schools with a completed questionnaire had no eligible students, so they were not included as participating cooperating schools.

Table 19-3 (continued)

School Characteristics in Main Samples (All Samples)

	Grade 4	Grade 8	Grade 12	Total
SCHOOL TYPE				
Public	387	335	428	1,150
Nonpublic	200	243	151	594
Private	81	91	90	262
Catholic	119	152	61	332
BIA	0	0	1	1
DoDea	0	0	0	
NUMBER OF TEACHERS				
Unclassified	0	0	0	0
1-4	15	9	4	28
5-9	84	61	18	163
10-19	141	149	52	342
20-49	311	244	202	757
50-74	30	89	122	241
75-99	5	20	69	94
100+	1	8	113	122
Missing	18	14	15	47
NUMBER OF STUDENTS				
Unclassified	0	0	0	0
1-99	34	18	22	74
100-299	176	184	103	463
300-499	173	113	69	355
500-749	133	105	89	327
750-999	53	86	55	194
1000-1499	12	51	89	152
1500+	6	23	153	182
Missing	18	14	15	47

Table 19-4

School Characteristics in Long-Term Trend Samples

	Age Class			
	9	13	17	TOTAL
TOTAL ORIGINAL SAMPLE	291	316	237	844
Cooperating	240	238	191	669
No Eligibles Enrolled	8	27	2	37
School Refused	43	51	44	138
COOPERATION RATE	85	84	81	81
COOPERATING REPLACEMENTS FOR REFUSALS	8	4	0	12
TOTALS				
Cooperating Schools	248	242	191	681
Completed Questionnaires	248	242	191	681
REGION				
Northeast	51	54	36	141
Southeast	62	64	56	182
Central	59	54	42	155
West	76	70	57	203

Table 19-5

Numbers of Responses to Teacher Questionnaires and Students Matched with Teacher Data

	Number of Teachers Responding	Number of Students with		
		No Match	Partial Match	Complete Match
MATH				
GRADE 4				
Main	752	408	99	6,105
Estimation	320	154	11	1,841
Theme	608	351	34	3,405
Advanced	0	0	0	0
GRADE 8				
Main	607	953	49	6,144
Estimation	242	274	8	1,901
Theme	437	603	51	3,373
Advanced	330	343	9	1,985
GRADE 12				
Main	0	0	0	0
Estimation	0	0	0	0
Theme	0	0	0	0
Advanced	404	393	241	2,331
SCIENCE				
GRADE 4				
Main	535	646	159	6,500
Advanced	0	0	0	0
GRADE 8				
Main	371	1,258	112	6,404
Advanced	0	0	0	0
GRADE 12				
Main	0	0	0	0
Advanced	0	0	0	0

Table 19-6

Number of Students Assessed and Excluded by Sample and Age Class

	Age Class		
	9	13	17
ASSESSED STUDENTS	30,178	34,618	33,629
Cross-Sectional	19,745	23,467	25,421
Math	12440	15,693	15,453
Main	6,627	7,146	6,904
Estimation	2,023	2,183	1,849
Theme	3,790	4,027	3,735
Advanced	0	2,337	2,965
Science	7305	7,774	9,968
Main	7305	7,774	7,537
Advanced	0	0	2,431
Long-Term Trend	10,433	11,151	8,208
Reading and Writing	5,019	5,493	4,669
Math and Science	5,414	5,658	3,539
EXCLUDED STUDENTS	2,256	1,698	1,435
Cross-Sectional	1,139	765	722
Math	383	339	297
Main	204	166	116
Estimation	43	56	75
Theme	136	113	99
Advanced	0	4	7
Science	756	426	425
Main	756	426	425
Advanced	0	0	0
Long-Term Trend	1,117	933	713
Reading and Writing	532	481	412
Math and Science	585	452	301

Table 19-7

Number of Students in the Mathematics Main and Estimation Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ESTIMATION		
	Grade 4	Grade 8	Grade 12	Grade 4	Grade 8	Grade 12
TOTAL	6,627	7,146	6,904	2,023	2,183	1,849
GENDER						
Male	3,290	3,597	3,244	994	1,052	898
Female	3,337	3,549	3,660	1,029	1,131	951
RACE/ETHNICITY						
White	4,125	4,501	4,596	1,193	1,407	1,258
Black	1,106	1,193	1,106	348	370	273
Hispanic	974	911	732	328	247	229
Asian American	250	408	339	98	124	72
American Indian	149	110	115	53	26	10
Unclassified	23	23	16	3	9	7
REGION						
Northeast	1,414	1,312	1,414	471	489	297
Southeast	1,669	1,883	1,924	540	520	509
Central	1,606	1,726	1,675	396	549	470
West	1,938	2,225	1,891	616	625	573
PARENT'S EDUCATION						
Less Than High School	219	466	462	77	113	125
High School	837	1,503	1,300	227	438	305
Greater Than High School	462	1,310	1,741	146	361	390
Graduated College	2,804	3,112	3,177	852	994	985
Unknown	2,232	736	200	681	247	39
TYPE OF LOCATION						
Central City	2,380	3,218	2,555	859	988	823
Urban Fringe/Large Town	2,794	2,186	2,428	721	698	618
Rural/Small Town	1,453	1,742	1,921	443	497	408
SCHOOL TYPE						
Public	5,215	5,590	5,398	1,528	1,707	1,340
Nonpublic	1,412	1,556	1,455	495	476	509
Private	458	576	521	164	117	200
Catholic	954	980	934	331	359	309
BIA	0	0	51	0	0	0
DoDEA	0	0	0	0	0	0
MODAL AGE						
Younger	35	48	92	12	4	21
At Modal Age	4,197	4,380	4,441	1,335	1,333	1,194
Older	2,395	2,718	2,371	676	846	634

Table 19-8

Number of Students in the Mathematics Theme and Advanced Samples by Subgroup Classification, Grades 4, 8 and 12

	THEME			ADVANCED		
	Grade 4	**Grade 8**	**Grade 12**	**Grade 4***	**Grade 8**	**Grade 12**
TOTAL	3,790	4,027	3,735	0	2,337	2,971
GENDER						
Male	1,905	2,030	1,797	0	1,130	1,532
Female	1,885	1,997	1,938	0	1,207	1,439
RACE/ETHNICITY						
White	2,206	2,440	2,279	0	1,650	2,001
Black	655	731	695	0	280	319
Hispanic	672	641	497	0	216	327
Asian American	169	140	228	0	149	306
American Indian	84	65	26	0	33	12
Unclassified	4	10	10	0	9	6
REGION						
Northeast	723	608	851	0	413	638
Southeast	1,037	1,125	1,025	0	552	800
Central	887	937	742	0	626	666
West	1,143	1,357	1,117	0	746	867
PARENT'S EDUCATION						
Less Than High School	162	320	296	0	84	129
High School	498	922	746	0	308	398
Greater Than High School	277	732	980	0	445	664
Graduated College	1,494	1,648	1,578	0	1,352	1,709
Unknown	1,354	396	125	0	121	54
TYPE OF LOCATION						
Central City	1,721	1,495	1,452	0	968	1,106
Urban Fringe/Large Town	1,289	1,798	1,339	0	902	1,106
Rural/Small Town	780	734	944	0	467	759
SCHOOL TYPE						
Public	3,034	3,438	3,075	0	1,661	2,130
Nonpublic	756	589	660	0	676	841
Private	299	219	235	0	234	346
Catholic	457	370	425	0	442	495
BIA	0	0	0	0	0	0
DoDEA	0	0	0	0	0	0
MODAL AGE						
Younger	16	21	63	0	18	51
At Modal Age	2,467	2,417	2,427	0	1,594	2,113
Older	1,307	1,589	1,245	0	725	807

*Advanced students not sampled for Grade 4.

Table 19-9

Number of Students in the Science Main and Advanced Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ADVANCED		
	Grade 4	Grade 8	Grade 12	Grade 4*	Grade 8*	Grade 12
TOTAL	7,305	7,774	7,537	0	0	2,431
GENDER						
Male	3,651	3,872	3,547	0	0	1,167
Female	3,654	3,902	3,990	0	0	1,264
RACE/ETHNICITY						
White	4,106	4,292	4,748	0	0	1,714
Black	1,251	1,492	1,225	0	0	293
Hispanic	1,352	1,426	1,015	0	0	197
Asian American	356	382	458	0	0	209
American Indian	223	149	70	0	0	12
Unclassified	17	33	21	0	0	6
REGION						
Northeast	1,503	1,068	1,562	0	0	541
Southeast	1,843	2,246	2,148	0	0	695
Central	1,699	1,595	1,589	0	0	634
West	2,260	2,865	2,238	0	0	561
PARENT'S EDUCATION						
Less Than High School	271	553	606	0	0	87
High School	938	1,471	1,414	0	0	272
Greater Than High School	544	1,428	1,879	0	0	526
Graduated College	2,994	3,400	3,308	0	0	1,476
Unknown	2,433	774	211	0	0	0
TYPE OF LOCATION						
Central City	3,228	3,055	3,080	0	0	949
Urban Fringe/Large Town	2,769	2,963	2,488	0	0	895
Rural/Small Town	1,308	1,756	1,969	0	0	587
SCHOOL TYPE						
Public	5,814	6,376	6,112	0	0	1,739
Nonpublic	1,491	1,398	1,425	0	0	692
Private	499	597	499	0	0	185
Catholic	992	801	926	0	0	507
BIA	0	0	0	0	0	0
DODEA	0	0	0	0	0	0
MODAL AGE						
Younger	46	46	93	0	0	38
At Modal Age	4,739	4,553	4,802	0	0	1,720
Older	2,520	3,175	2,642	0	0	673

*Advanced students not sampled for Grade 4 and Grade 8.

Table 19-10

Number of Excluded Students in the Mathematics Main and Estimation Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ESTIMATION		
	Grade 4	**Grade 8**	**Grade 12**	**Grade 4**	**Grade 8**	**Grade 12**
TOTAL	204	166	116	43	56	75
GENDER						
Male	122	104	72	33	34	44
Female	82	62	44	10	22	31
RACE/ETHNICITY						
White	92	100	65	24	33	32
Black	34	30	22	7	8	16
Hispanic	66	18	25	9	12	23
Asian American	8	10	3	2	3	4
American Indian	3	3	1	1	0	0
Unclassified	1	5	0	0	0	0
REGION						
Northeast	21	45	22	5	19	8
Southeast	49	34	27	9	11	9
Central	29	36	18	14	11	9
West	105	51	49	15	15	49
PARENT'S EDUCATION						
Less Than High School	0	0	0	0	0	0
High School	0	0	0	0	0	0
Greater Than High School	0	0	0	0	0	0
Graduated College	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
TYPE OF LOCATION						
Central City	82	64	40	10	29	36
Urban Fringe/Large Town	61	50	44	21	15	13
Rural/Small Town	61	52	32	12	12	26
SCHOOL TYPE						
Public	197	162	115	43	56	75
Nonpublic	7	4	1	0	0	0
Private	1	0	0	0	0	0
Catholic	6	4	1	0	0	0
BIA	0	0	0	0	0	0
DoDEA	0	0	0	0	0	0
MODAL AGE						
Younger	0	3	1	0	0	0
At Modal Age	106	48	31	22	21	17
Older	98	115	84	21	35	58

Table 19-11

Number of Excluded Students in the Mathematics Theme and Advanced Sample by Subgroup Classification, Grades 4, 8, and 12

	THEME			ADVANCED		
	Grade 4	Grade 8	Grade 12	Grade 4*	Grade 8	Grade 12
TOTAL	136	113	99	0	4	7
GENDER						
Male	71	59	55	0	4	6
Female	65	54	44	0	0	1
RACE/ETHNICITY						
White	37	34	55	0	2	2
Black	26	30	17	0	0	0
Hispanic	60	44	19	0	0	0
Asian American	9	3	7	0	2	5
American Indian	3	2	1	0	0	0
Unclassified	1	0	0	0	0	0
REGION						
Northeast	18	15	30	0	0	2
Southeast	23	37	25	0	2	0
Central	29	15	8	0	0	2
West	66	46	36	0	2	3
PARENT'S EDUCATION						
Less Than High School	0	0	0	0	0	0
High School	0	0	0	0	0	0
Greater Than High School	0	0	0	0	0	0
Graduated College	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
TYPE OF LOCATION						
Central City	91	45	52	0	2	4
Urban Fringe/Large Town	35	47	31	0	0	1
Rural/Small Town	10	21	16	0	2	2
SCHOOL TYPE						
Public	133	112	91	0	4	7
Nonpublic	3	1	8	0	0	0
Private	1	0	8	0	0	0
Catholic	2	1	0	0	0	0
BIA	0	0	0	0	0	0
DoDEA	0	0	0	0	0	0
MODAL AGE						
Younger	2	3	1	0	0	0
At Modal Age	77	46	21	0	2	3
Older	57	64	77	0	2	4

*Advanced students not sampled for Grade 4.

Table 19-12

Number of Excluded Students in the Science Main and Advanced Samples by Subgroup Classification, Grades 4 ,8, and 12

	MAIN			ADVANCED		
	Grade 4	Grade 8	Grade 12	Grade 4	Grade 8	Grade 12
TOTAL	756	426	425	0	0	0
SEX						
Male	457	265	259	0	0	0
Female	299	161	166	0	0	0
RACE/ETHNICITY						
White	239	145	185	0	0	0
Black	124	98	103	0	0	0
Hispanic	317	159	99	0	0	0
Asian American	65	15	33	0	0	0
American Indian	5	7	2	0	0	0
Unclassified	6	2	3	0	0	0
REGION						
Northeast	91	38	84	0	0	0
Southeast	170	119	112	0	0	0
Central	132	40	57	0	0	0
West	363	229	172	0	0	0
PARENT'S EDUCATION						
Less Than High School	0	0	0	0	0	0
High School	0	1	0	0	0	0
Greater Than High School	0	0	0	0	0	0
Graduated College	0	0	0	0	0	0
Unknown	0	0	0	0	0	0
TYPE OF LOCATION						
Central City	482	187	212	0	0	0
Urban Fringe/Large Town	178	136	127	0	0	0
Rural/Small Town	96	103	86	0	0	0
SCHOOL TYPE						
Public	752	424	419	0	0	0
Nonpublic	4	2	6	0	0	0
Private	2	0	5	0	0	0
Catholic	2	2	1	0	0	0
BIA	0	0	0	0	0	0
DoDEA	0	0	0	0	0	0
MODAL AGE						
<Modal Age	8	5	6	0	0	0
=Modal Age	363	144	113	0	0	0
>Modal Age	385	277	306	0	0	0

Table 19-13

Number of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9/Grade 4

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,654	3,789	2,424	5,019
GENDER				
Male	1,808	1,838	1,128	2,518
Female	1,846	1,951	1,296	2,501
RACE/ETHNICITY				
White	2,067	2,183	1,356	2,894
Black	598	634	421	811
Hispanic	741	727	462	1,006
Asian American	139	151	126	164
American Indian	99	83	50	132
Unclassified	10	11	9	12
REGION				
Northeast	795	861	630	1,026
Southeast	1,027	1,019	622	1,424
Central	707	747	413	1,041
West	1,125	1,162	759	1,528
PARENT'S EDUCATION				
Less Than High School	158	176	99	235
High School	574	615	367	822
Greater Than High School	187	181	117	251
Graduated College	1,430	1,562	1,016	1,976
Unknown	1,274	1,212	806	1,680
TYPE OF LOCATION				
Central City	1,513	1,635	1,019	2,129
Urban Fringe/Large Town	1,271	1,297	893	1,675
Rural/Small Town	870	857	512	1,215
SCHOOL TYPE				
Public	3,237	3,342	2,116	4,463
Nonpublic	417	447	308	556
Private	174	169	116	227
Catholic	243	278	192	329
BIA	0	0	0	0
DoDEA	0	0	0	0

Table 19-14

Number of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13/Grade 8

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,847	4,150	2,504	5,493
GENDER				
Male	1,870	2,060	1,124	2,806
Female	1,977	2,090	1,380	2,687
RACE/ETHNICITY				
White	2,389	2,550	1,518	3,421
Black	540	593	348	785
Hispanic	565	635	373	827
Asian American	222	226	178	270
American Indian	125	141	84	182
Unclassified	6	5	3	8
REGION				
Northeast	811	894	582	1,123
Southeast	1,088	1,159	662	1,585
Central	771	854	478	1,147
West	1,177	1,243	782	1,638
PARENT'S EDUCATION				
Less Than High School	217	301	143	375
High School	1,089	1,172	690	1,571
Greater Than High School	406	441	281	566
Graduated College	1,725	1,846	1,164	2,407
Unknown	394	375	218	551
TYPE OF LOCATION				
Central City	1,441	1,560	937	2,064
Urban Fringe/Large Town	1,412	1,455	952	1,915
Rural/Small Town	994	1,135	615	1,514
SCHOOL TYPE				
Public	3,421	3,720	2,217	4,924
Nonpublic	410	396	274	532
Private	190	190	138	242
Catholic	220	206	136	290
BIA	16	34	13	37
DODEA	0	0	0	0

Table 19-15

Number of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17/Grade 11

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,681	3,737	2,749	4,669
GENDER				
Male	1,874	1,943	1,356	2,461
Female	1,807	1,794	1,393	2,208
RACE/ETHNICITY				
White	2,528	2,573	1,986	3,115
Black	449	440	279	610
Hispanic	465	468	302	631
Asian American	163	178	123	218
American Indian	69	67	52	84
Unclassified	7	11	7	11
REGION				
Northeast	682	721	523	880
Southeast	1,063	1,038	748	1,353
Central	871	900	686	1,085
West	1,065	1,078	792	1,351
PARENT'S EDUCATION				
Less Than High School	251	254	151	354
High School	945	947	675	1,217
Greater Than High School	672	692	528	836
Graduated College	1,673	1,717	1,316	2074
Unknown	103	96	61	138
TYPE OF LOCATION				
Central City	1,111	1,101	780	1,432
Urban Fringe/Large Town	1,537	1,577	1,196	1,918
Rural/Small Town	1,033	1,059	773	1,319
SCHOOL TYPE				
Public	3,384	3,411	2,511	4,284
Nonpublic	289	318	230	377
Private	140	145	105	180
Catholic	149	173	125	197
BIA	8	8	8	8
DODEA	0	0	0	0

Table 19-16

Number of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	5414	3,665	3,665	5,414
GENDER				
Male	2,709	1,766	1,766	2,709
Female	2,705	1,899	1,899	2,705
RACE/ETHNICITY				
White	3,204	2,146	2,146	3,204
Black	801	578	578	801
Hispanic	1,075	687	687	1,075
Asian American	188	156	156	188
American Indian	134	88	88	134
Unclassified	12	10	10	12
REGION				
Northeast	1,142	918	918	1,142
Southeast	1,436	906	906	1,436
Central	1,188	698	698	1,188
West	1,648	1,143	1,143	1,648
PARENT'S EDUCATION				
Less Than High School	230	146	146	230
High School	713	466	466	713
Greater Than High School	386	289	289	386
Graduated College	2,274	1,604	1,604	2,274
Unknown	1,792	1,150	1,150	1,792
TYPE OF LOCATION				
Central City	2,485	1,721	1,721	2,485
Urban Fringe/Large Town	1,670	1,198	1,198	1,670
Rural/Small Town	1,259	746	746	1,259
SCHOOL TYPE				
Public	4,790	3,231	3,231	4,790
Nonpublic	609	422	422	609
Private	162	104	104	162
Catholic	447	318	318	447
BIA	15	12	12	15
DODEA	0	0	0	0

[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-17

Number of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	5,658	3,662	3,662	5,658
GENDER				
Male	2,736	1,652	1,652	2,736
Female	2,922	2,010	2,010	2,922
RACE/ETHNICITY				
White	3,528	2,272	2,272	3,528
Black	776	509	509	776
Hispanic	943	565	565	943
Asian American	293	234	234	293
American Indian	112	76	76	112
Unclassified	6	6	6	6
REGION				
Northeast	1,221	900	900	1,221
Southeast	1,589	937	937	1,589
Central	1,129	693	693	1,129
West	1,719	1,132	1,132	1,719
PARENT'S EDUCATION				
Less Than High School	353	188	188	353
High School	1,295	815	815	1,295
Greater Than High School	943	672	672	943
Graduated College	2,458	1,655	1,655	2,458
Unknown	587	320	320	587
TYPE OF LOCATION				
Central City	2,063	1,357	1,357	2,063
Urban Fringe/Large Town	2,047	1,386	1,386	2,047
Rural/Small Town	1,548	919	919	1,548
SCHOOL TYPE				
Public	5,096	3,260	3,260	5,096
Nonpublic	562	402	402	562
Private	224	181	181	224
Catholic	338	221	221	338
BIA	0	0	0	0
DODEA	0	0	0	0

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[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-18

Number of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,539	2,532	2,532	3,539
GENDER				
Male	1,755	1,196	1,196	1,755
Female	1,784	1,336	1,336	1,784
RACE/ETHNICITY				
White	2,401	1,836	1,836	2,401
Black	531	329	329	531
Hispanic	401	244	244	401
Asian American	155	94	94	155
American Indian	43	23	23	43
Unclassified	8	6	6	8
REGION				
Northeast	712	519	519	712
Southeast	1,122	803	803	1,122
Central	733	529	529	733
West	972	681	681	972
PARENT'S EDUCATION				
Less Than High School	236	122	122	236
High School	757	506	506	757
Greater Than High School	835	616	616	835
Graduated College	1,619	1,238	1,238	1,619
Unknown	71	37	37	71
TYPE OF LOCATION				
Central City	1,311	896	896	1,311
Urban Fringe/Large Town	1,189	883	883	1,189
Rural/Small Town	1,039	753	753	1,039
SCHOOL TYPE				
Public	3,257	2,309	2,309	3,257
Nonpublic	282	223	223	282
Private	124	99	99	124
Catholic	158	124	124	158
BIA	0	0	0	0
DODEA	0	0	0	0

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[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-19

Number of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9/Grade 4

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	345	404	217	532
SEX				
Male	207	243	124	326
Female	138	161	93	206
RACE/ETHNICITY				
White	133	161	66	228
Black	54	66	30	90
Hispanic	122	134	90	166
Asian American	30	35	26	39
American Indian	3	6	3	6
Unclassified	3	2	2	3
REGION				
Northeast	30	46	19	57
Southeast	96	130	52	174
Central	49	47	18	78
West	170	181	128	223
TYPE OF LOCATION				
Central City	189	211	130	270
Urban Fringe/Large Town	106	117	69	154
Rural/Small Town	50	76	18	108
SCHOOL TYPE				
Public	340	402	215	527
Nonpublic	4	2	2	4
Private	0	0	0	0
Catholic	4	2	2	4
BIA	0	0	0	0
DoDea	0	0	0	0

Table 19-20

Number of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13/Grade 8

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	265	303	87	481
SEX				
Male	175	211	67	319
Female	90	92	20	162
RACE/ETHNICITY				
White	153	187	47	293
Black	33	35	8	60
Hispanic	58	58	23	93
Asian American	10	11		16
American Indian	12	4	18	
Unclassified	1	0	0	1
REGION				
Northeast	45	46	17	74
Southeast	93	104	21	176
Central	41	74	14	101
West	86	79	35	130
TYPE OF LOCATION				
Central City	118	121	35	204
Urban Fringe/Large Town	79	80	35	124
Rural/Small Town	68	102	17	153
SCHOOL TYPE				
Public	257	291	84	464
Nonpublic	3	1	0	4
Private	2	1	0	3
Catholic	1	0	0	1
BIA	5	11	3	13
DoDea	0	0	0	0

Table 19-21

Number of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17/Grade 11

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	277	227	92	412
SEX				
Male	171	139	43	267
Female	106	88	49	145
RACE/ETHNICITY				
White	161	151	63	249
Black	65	33	18	80
Hispanic	35	26	7	54
Asian American	10	10	1	19
American Indian	4	7	3	8
Unclassified	2	0	0	2
REGION				
Northeast	36	44	18	62
Southeast	117	75	32	160
Central	51	41	15	77
West	73	67	27	113
TYPE OF LOCATION				
Central City	80	68	25	123
Urban Fringe/Large Town	107	105	46	166
Rural/Small Town	90	54	21	123
SCHOOL TYPE				
Public	277	224	92	409
Nonpublic	0	1	0	1
Private	0	0	0	0
Catholic	0	1	0	1
BIA	0	2	0	2
DoDea	0	0	0	0

Table 19-22

Number of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9/Grade 4

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	585	316	316	585
SEX				
Male	360	192	192	360
Female	225	124	124	225
RACE/ETHNICITY				
White	220	103	103	220
Black	96	41	41	96
Hispanic	217	133	133	217
Asian American	45	35	35	45
American Indian	2	1	1	2
Unclassified	5	3	3	5
REGION				
Northeast	65	38	38	65
Southeast	202	72	72	202
Central	80	35	35	80
West	238	171	171	238
TYPE OF LOCATION				
Central City	334	200	200	334
Urban Fringe/Large Town	148	91	91	148
Rural/Small Town	103	25	25	103
SCHOOL TYPE				
Public	578	314	314	578
Nonpublic	7	2	2	7
Private	0	0	0	0
Catholic	7	2	2	7
BIA	0	0	0	0
DoDea	0	0	0	0

Table 19-23

Number of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age13/Grade 8

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	452	150	150	452
SEX				
Male	286	86	86	286
Female	166	64	64	166
RACE/ETHNICITY				
White	239	75	75	239
Black	76	20	20	76
Hispanic	116	47	47	116
Asian American	16	7	7	16
American Indian	2	1	1	2
Unclassified	3	0	0	3
REGION				
Northeast	87	34	34	87
Southeast	156	41	41	156
Central	89	25	25	89
West	120	50	50	120
TYPE OF LOCATION				
Central City	187	57	57	187
Urban Fringe/Large Town	125	57	57	125
Rural/Small Town	140	36	36	140
SCHOOL TYPE				
Public	450	150	150	450
Nonpublic	2	0	0	2
Private	2	0	0	2
Catholic	0	0	0	0
BIA	0	0	0	0
DoDea	0	0	0	0

Table 19-24

Number of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age17/Grade 11

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
TOTAL	301	110	110	301
SEX				
Male	202	67	67	202
Female	99	43	43	99
RACE/ETHNICITY				
White	170	75	75	170
Black	55	17	17	55
Hispanic	55	14	14	55
Asian American	16	3	3	16
American Indian	5	1	1	5
Unclassified	0	0	0	0
REGION				
Northeast	57	36	36	57
Southeast	103	24	24	103
Central	51	18	18	51
West	90	32	32	90
TYPE OF LOCATION				
Central City	109	36	36	109
Urban Fringe/Large Town	107	50	50	107
Rural/Small Town	85	24	24	85
SCHOOL TYPE				
Public	298	110	110	298
Nonpublic	3	0	0	3
Private	3	0	0	3
Catholic	0	0	0	0
BIA	0	0	0	0
DoDea	0	0	0	0

Table 19-25

Weighted Percentage of Students in the Mathematics Main and Estimation Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ESTIMATION		
	Grade 4	Grade 8	Grade 12	Grade 4	Grade 8	Grade 12
TOTAL	3,711,786	3,566,392	2,827,040	3,688,821	3,598,564	2,740,931
GENDER						
Male	50.8	52.3	47.6	49.3	50.4	47.4
Female	49.2	47.7	52.4	50.7	49.6	52.6
RACE/ETHNICITY						
White	67.8	69.1	69.6	68.0	69.6	70.3
Black	14.6	14.2	14.1	14.6	14.1	13.8
Hispanic	12.9	12.3	11.2	13.0	11.9	11.4
Asian American	2.7	3.3	3.6	2.5	3.3	3.9
American Indian	1.7	1.1	1.3	1.9	0.9	0.4
Unclassified	0.2	0.1	0.2	0.1	0.2	0.2
REGION						
Northeast	21.9	20.3	21.8	21.6	20.7	23.5
Southeast	21.0	23.3	21.6	22.1	21.3	20.6
Central	24.8	24.3	24.0	24.6	24.4	24.5
West	32.3	32.1	32.6	31.7	33.7	31.5
PARENT'S EDUCATION						
Less Than High School	3.8	6.9	6.4	3.8	6.0	6.6
High School	12.5	21.8	18.8	11.6	22.0	17.2
Greater Than High School	7.0	18.5	25.4	7.5	16.3	21.0
Graduated College	39.4	41.7	46.4	40.0	42.5	52.9
Unknown	35.6	10.7	2.7	34.9	11.5	2.1
TYPE OF LOCATION						
Central City	30.1	33.3	31.7	37.3	37.1	39.3
Urban Fringe/Large Town	46.2	36.2	39.8	36.5	36.8	34.1
Rural/Small Town	23.7	30.5	28.5	26.2	26.1	26.6
SCHOOL TYPE						
Public	89.1	89.3	87.3	85.4	88.6	83.1
Non Public	10.9	10.7	12.0	14.6	11.4	16.9
Private	3.7	4.5	4.2	5.7	4.0	6.9
Catholic	7.2	6.3	7.9	8.9	7.4	10.0
BIA	0.0	0.0	0.6	0.0	0.0	0.0
DoDEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
Younger	0.6	0.6	1.3	0.6	0.1	1.1
At Modal Age	59.6	56.2	64.9	60.8	55.6	65.2
Older	39.8	43.1	33.8	38.6	44.3	33.7

Table 19-26

Weighted Percentage of Students in the Mathematics Theme and Advanced Mathematics Samples by Subgroup Classification, Grades 4, 8, and 12

	THEME			ADVANCED		
	Grade 4	**Grade 8**	**Grade 12**	**Grade 4***	**Grade 8**	**Grade 12**
TOTAL	3,690,245	3,566,103	2,845,023	0	809,085	696,805
GENDER						
Male	51.8	52.6	49.2	0.0	48.3	50.6
Female	48.2	47.4	50.8	0.0	51.7	49.4
RACE/ETHNICITY						
White	68.5	70.5	69.3	0.0	71.0	74.1
Black	14.5	13.7	14.2	0.0	14.3	7.2
Hispanic	12.5	11.6	11.6	0.0	6.5	7.9
Asian American	2.9	2.4	4.2	0.0	5.6	10.3
American Indian	1.5	1.7	0.5	0.0	2.2	0.3
Unclassified	0.1	0.1	0.2	0.0	0.4	0.2
REGION						
Northeast	21.0	20.7	23.2	0.0	26.9	24.8
Southeast	22.9	22.5	21.2	0.0	16.9	21.0
Central	25.7	23.0	23.4	0.0	29.9	28.6
West	30.4	33.8	32.1	0.0	26.3	25.6
PARENT'S EDUCATION						
Less Than High School	4.5	7.9	6.9	0.0	3.0	3.8
High School	12.6	23.8	19.1	0.0	13.7	13.3
Greater Than High School	7.4	18.1	26.5	0.0	20.2	22.6
Graduated College	40.1	40.5	44.2	0.0	57.4	58.5
Unknown	35.3	9.4	3.2	0.0	4.7	1.5
TYPE OF LOCATION						
Central City	39.9	28.1	31.6	0.0	36.1	32.0
Urban Fringe/Large Town	37.7	49.2	41.3	0.0	38.7	38.5
Rural/Small Town	22.4	22.7	27.1	0.0	25.2	29.4
SCHOOL TYPE						
Public	87.6	90.5	88.7	0.0	83.5	81.5
Nonpublic	12.4	9.5	11.3	0.0	16.5	18.5
Private	5.0	3.9	3.9	0.0	5.3	7.9
Catholic	7.4	5.5	7.4	0.0	11.3	10.6
BIA	0.0	0.0	0.0	0.0	0.0	0.0
DoDEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
Younger	0.4	0.6	1.5	0.0	0.7	1.5
At Modal Age	59.0	55.5	64.4	0.0	68.7	72.2
Older	40.5	43.9	34.1	0.0	30.6	26.3

*Advanced students not sampled for Grade 4.

Table 19-27

Weighted Percentage of Students in the Science Main and Advanced Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ADVANCED		
	Grade 4	Grade 8	Grade 12	Grade 4[1]	Grade 8[1]	Grade 12
TOTAL	3,618,494	3,564,079	2,903,402	0	0	585,798
GENDER						
Male	50.3	50.8	48.4	0.0	0.0	49.2
Female	49.7	49.2	51.6	0.0	0.0	50.8
RACE/ETHNICITY						
White	68.8	69.6	69.9	0.0	0.0	74.1
Black	14.6	14.1	14.3	0.0	0.0	9.1
Hispanic	12.2	11.8	11.2	0.0	0.0	7.0
Asian American	2.6	2.6	3.8	0.0	0.0	9.1
American Indian	1.8	1.7	0.7	0.0	0.0	0.5
Unclassified	0.1	0.2	0.1	0.0	0.0	0.2
REGION						
Northeast	21.8	22.1	21.6	0.0	0.0	24.4
Southeast	22.4	21.8	21.2	0.0	0.0	21.2
Central	25.7	23.8	24.2	0.0	0.0	30.4
West	30.0	32.3	33.1	0.0	0.0	24.0
PARENT'S EDUCATION						
Less Than High School	4.2	6.2	6.6	0.0	0.0	2.7
High School	13.6	19.5	18.2	0.0	0.0	11.2
Greater Than High School	7.4	19.5	25.2	0.0	0.0	20.8
Graduated College	39.7	44.0	45.8	0.0	0.0	62.8
Unknown	33.2	9.1	2.5	0.0	0.0	0.0
TYPE OF LOCATION						
Central City	36.9	26.6	35.0	0.0	0.0	31.2
Urban Fringe/Large Town	38.1	45.1	36.3	0.0	0.0	41.3
Rural/Small Town	25.0	28.3	28.7	0.0	0.0	27.4
SCHOOL TYPE						
Public	87.5	88.8	87.7	0.0	0.0	83.0
Nonpublic	12.5	11.2	12.3	0.0	0.0	17.0
Private	4.8	4.7	4.4	0.0	0.0	5.4
Catholic	7.7	6.6	7.9	0.0	0.0	11.7
BIA	0.0	0.0	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
Younger	0.7	0.6	1.1	0.0	0.0	1.4
At Modal Age	59.3	54.5	63.6	0.0	0.0	70.9
Older	40.0	44.9	35.3	0.0	0.0	27.7

[1] Advanced students not sampled for Grade 4 or Grade 8.

Table 19-28

Weighted Percentage of Excluded Students in the Mathematics Main and Estimation Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ESTIMATION		
	Grade 4	Grade 8	Grade 12	Grade 4	Grade 8	Grade 12
TOTAL	229,564	162,944	88,046	180,417	142,276	110,197
GENDER						
Male	62.0	62.1	67.9	77.2	56.8	56.3
Female	38.0	37.9	32.1	22.8	43.2	43.7
RACE/ETHNICITY						
White	56.1	65.5	65.2	69.4	64.3	42.7
Black	16.4	18.3	15.9	11.8	12.6	24.4
Hispanic	22.9	11.2	17.6	14.2	19.2	29.3
Asian American	2.6	2.8	1.0	2.5	3.9	3.6
American Indian	1.6	1.4	0.3	2.1	0.0	0.0
Unclassified	0.3	0.8	0.0	0.0	0.0	0.0
REGION						
Northeast	12.2	22.0	29.8	12.4	22.1	16.4
Southeast	25.0	20.5	19.7	19.0	20.8	13.3
Central	16.4	24.6	14.4	35.8	18.1	14.9
West	46.4	32.9	36.2	32.8	39.0	55.4
PARENT'S EDUCATION						
Less Than High School	0.0	0.0	0.0	0.0	0.0	0.0
High School	0.0	0.0	0.0	0.0	0.0	0.0
Greater Than High School	0.0	0.0	0.0	0.0	0.0	0.0
Graduated College	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	0.0	0.0	0.0	0.0	0.0
TYPE OF LOCATION						
Central City	28.8	38.1	27.9	23.5	49.7	51.1
Urban Fringe/Large Town	35.6	35.6	51.4	46.9	24.5	18.3
Rural/Small Town	35.6	26.3	20.8	29.5	25.7	30.6
SCHOOL TYPE						
Public	97.8	99.4	99.5	100.0	100.0	100.0
Non Public	2.2	0.6	0.5	0.0	0.0	0.0
Private	1.0	0.0	0.0	0.0	0.0	0.0
Catholic	1.1	0.6	0.5	0.0	0.0	0.0
BIA	0.0	0.0	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
Younger	0.0	2.4	0.8	0.0	0.0	0.0
At Modal Age	41.0	23.1	36.2	48.8	33.8	20.3
Older	59.0	74.5	63.0	51.2	66.2	79.7

Table 19-29

Weighted Percentage of Excluded Students in the Mathematics Theme and Advanced Samples by Subgroup Classification, Grades 4, 8, and 12

	THEME			ADVANCED		
	Grade 4	**Grade 8**	**Grade 12**	**Grade 4[1]**	**Grade 8**	**Grade 12**
TOTAL	238,555	160,860	115,182	0	1,042	1,701
GENDER						
Male	58.3	55.1	57.1	0.0	100.0	89.2
Female	41.7	44.9	42.9	0.0	0.0	10.8
RACE/ETHNICITY						
White	42.0	46.0	67.7	0.0	0.0	36.1
Black	18.2	25.3	13.8	0.0	0.0	0.0
Hispanic	31.3	24.3	14.8	0.0	0.0	0.0
Asian American	4.9	1.7	3.1	0.0	100.0	63.9
American Indian	2.8	2.8	0.6	0.0	0.0	0.0
Unclassified	0.7	0.0	0.0	0.0	0.0	0.0
REGION						
Northeast	12.7	12.9	28.5	0.0	0.0	41.3
Southeast	18.9	31.0	21.0	0.0	0.0	0.0
Central	25.7	21.1	16.3	0.0	0.0	26.5
West	42.6	35.0	34.1	0.0	100.0	32.3
PARENT'S EDUCATION						
Less Than High School	0.0	0.0	0.0	0.0	0.0	0.0
High School	0.0	0.0	0.0	0.0	0.0	0.0
Greater Than High School	0.0	0.0	0.0	0.0	0.0	0.0
Graduated College	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	0.0	0.0	0.0	0.0	0.0
TYPE OF LOCATION						
Central City	54.8	31.3	42.3	0.0	100.0	41.0
Urban Fringe/Large Town	36.5	40.2	40.1	0.0	0.0	22.9
Rural/Small Town	8.7	28.5	17.6	0.0	0.0	36.1
SCHOOL TYPE						
Public	98.6	99.2	95.2	0.0	100.0	100.0
Nonpublic	1.4	0.8	4.8	0.0	0.0	0.0
Private	0.3	0.0	4.8	0.0	0.0	0.0
Catholic	1.1	0.8	0.0	0.0	0.0	0.0
BIA	0.0	0.0	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
Younger	2.7	1.5	0.4	0.0	0.0	0.0
At Modal Age	46.8	30.7	22.7	0.0	100.0	59.0
Older	50.6	67.8	76.8	0.0	0.0	41.0

[1] Advanced students not sampled for Grade 4.

Figure 19-30

Weighted Percentage of Excluded Students in the Science Main and Advanced Samples by Subgroup Classification, Grades 4, 8, and 12

	MAIN			ADVANCED		
	Grade 4	**Grade 8**	**Grade 12**	**Grade 4**	**Grade 8**	**Grade 12**
TOTAL	322,613	164,891	119,759	0	0	0
SEX						
Male	63.2	63.6	61.9	0.0	0.0	0.0
Female	36.4	38.1	38.1	0.0	0.0	0.0
RACE/ETHNICITY						
White	49.1	54.6	54.1	0.0	0.0	0.0
Black	16.6	19.4	22.4	0.0	0.0	0.0
Hispanic	27.6	21.6	18.1	0.0	0.0	0.0
Asian American	5.3	2.2	4.2	0.0	0.0	0.0
American Indian	0.8	2.0	0.5	0.0	0.0	0.0
Unclassified	0.5	0.2	0.7	0.0	0.0	0.0
REGION						
Northeast	14.6	12.7	21.8	0.0	0.0	0.0
Southeast	23.6	23.3	22.6	0.0	0.0	0.0
Central	22.2	21.9	18.3	0.0	0.0	0.0
West	39.6	42.2	37.2	0.0	0.0	0.0
PARENT'S EDUCATION						
Less Than High School	0.0	0.0	0.0	0.0	0.0	0.0
High School	0.0	0.5	0.0	0.0	0.0	0.0
Greater Than High School	0.0	0.0	0.0	0.0	0.0	0.0
Graduated College	0.0	0.0	0.0	0.0	0.0	0.0
Unknown	0.0	0.0	0.0	0.0	0.0	0.0
TYPE OF LOCATION						
Central City	52.0	29.1	40.1	0.0	0.0	0.0
Urban Fringe/Large Town	24.8	33.6	32.8	0.0	0.0	0.0
Rural/Small Town	23.3	37.3	27.1	0.0	0.0	0.0
SCHOOL TYPE						
Public	99.5	99.4	99.0	0.0	0.0	0.0
Nonpublic	0.5	0.6	1.0	0.0	0.0	0.0
Private	0.2	0.0	0.8	0.0	0.0	0.0
Catholic	0.3	0.6	0.2	0.0	0.0	0.0
BIA	0.0	0.0	0.0	0.0	0.0	0.0
DoDEA	0.0	0.0	0.0	0.0	0.0	0.0
MODAL AGE						
<Modal Age	0.9	1.0	1.1	0.0	0.0	0.0
=Modal Age	37.7	25.7	25.2	0.0	0.0	0.0
>Modal Age	61.3	73.2	73.7	0.0	0.0	0.0

Table 19-31

Weighted Percentage of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9/Grade 4

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,170,010	3,579,694	2,119,331	4,630,373
GENDER				
Male	49.5	49.3	46.3	50.8
Female	50.5	50.7	53.7	49.2
RACE/ETHNICITY				
White	66.7	68.3	67.5	67.6
Black	15.4	14.6	15.1	15.0
Hispanic	12.9	12.7	12.4	13.0
Asian American	2.6	2.6	3.5	2.3
American Indian	2.1	1.5	1.3	2.0
Unclassified	0.2	0.2	0.3	0.2
REGION				
Northeast	23.5	22.1	26.0	21.3
Southeast	23.9	23.8	22.2	24.6
Central	24.6	25.5	22.1	26.4
West	28.0	28.6	29.7	27.7
PARENT'S EDUCATION				
Less Than High School	4.0	4.4	3.9	4.4
High School	15.3	16.0	14.5	16.2
Greater Than High School	5.0	4.7	4.6	4.9
Graduated College	39.5	41.6	42.1	39.9
Unknown	35.5	32.2	34.1	33.6
TYPE OF LOCATION				
Central City	40.8	42.5	41.6	41.8
Urban Fringe/Large Town	34.3	33.4	36.6	32.6
Rural/Small Town	24.8	24.0	21.8	25.6
SCHOOL TYPE				
Public	86.2	86.3	85.2	86.7
Nonpublic	13.8	13.7	14.8	13.3
Private	6.8	6.2	6.7	6.4
Catholic	7.1	7.4	8.1	6.9
BIA	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0

Table 19-32

Weighted Percentage of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13/Grade 8

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,173,938	3,465,078	1,943,322	4,695,694
GENDER				
Male	48.6	50.3	44.4	51.6
Female	51.4	49.7	55.6	48.4
RACE/ETHNICITY				
White	66.6	69.1	68.9	67.4
Black	15.1	14.4	13.6	15.2
Hispanic	12.7	12.0	12.2	12.4
Asian American	3.5	2.8	3.8	2.9
American Indian	2.0	1.7	1.5	2.0
Unclassified	0.1	0.1	0.1	0.1
REGION				
Northeast	23.1	22.3	24.7	21.8
Southeast	25.5	25.0	23.8	25.9
Central	21.8	23.4	21.1	23.3
West	29.6	29.3	30.4	29.0
PARENT'S EDUCATION				
Less Than High School	5.3	7.0	5.3	6.5
High School	28.8	28.5	27.8	28.9
Greater Than High School	10.4	10.6	11.0	10.3
Graduated College	45.0	45.0	47.3	44.1
Unknown	10.1	8.5	8.4	9.7
TYPE OF LOCATION				
Central City	36.2	36.0	35.4	36.4
Urban Fringe/Large Town	35.7	33.9	38.2	33.3
Rural/Small Town	28.1	30.1	26.4	30.3
SCHOOL TYPE				
Public	88.5	89.4	87.9	89.4
Nonpublic	11.2	9.9	11.7	10.0
Private	4.8	4.6	5.7	4.3
Catholic	6.3	5.2	6.0	5.7
BIA	0.4	0.7	0.4	0.6
DODEA	0.0	0.0	0.0	0.0

Table 19-33

Weighted Percentage of Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17/Grade 11

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,224,505	3,160,512	1,977,398	4,407,619
GENDER				
Male	51.4	52.4	48.9	53.3
Female	48.6	47.6	51.1	46.7
RACE/ETHNICITY				
White	69.3	68.3	74.2	66.4
Black	14.4	15.1	11.7	16.1
Hispanic	11.7	12.4	9.9	13.0
Asian American	3.1	2.9	2.6	3.2
American Indian	1.4	1.2	1.3	1.3
Unclassified	0.1	0.2	0.2	0.1
REGION				
Northeast	22.3	24.9	23.9	23.5
Southeast	24.2	22.7	21.4	24.4
Central	24.5	24.5	26.0	23.8
West	29.0	27.9	28.8	28.3
PARENT'S EDUCATION				
Less Than High School	6.8	6.7	4.9	7.6
High School	26.7	26.0	24.7	27.1
Greater Than High School	18.0	18.7	19.8	17.7
Graduated College	44.7	45.2	47.9	43.6
Unknown	2.8	2.7	2.1	3.0
TYPE OF LOCATION				
Central City	34.7	34.2	32.3	35.4
Urban Fringe/Large Town	39.2	39.5	41.4	38.5
Rural/Small Town	26.1	26.3	26.4	26.1
SCHOOL TYPE				
Public	91.7	90.8	90.7	91.5
Nonpublic	8.1	9.0	9.0	8.3
Private	3.5	3.4	3.6	3.4
Catholic	4.6	5.6	5.4	4.9
BIA	0.2	0.2	0.4	0.2
DODEA	0.0	0.0	0.0	0.0

Table 19-34

Weighted Percentage of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,320,984	2,207,888	2,207,888	3,320,984
GENDER				
Male	49.6	48.0	48.0	49.6
Female	50.4	52.0	52.0	50.4
RACE/ETHNICITY				
White	69.0	68.1	68.1	69.0
Black	14.3	15.5	15.5	14.3
Hispanic	12.4	11.6	11.6	12.4
Asian American	2.3	2.9	2.9	2.3
American Indian	1.9	1.8	1.8	1.9
Unclassified	0.2	0.2	0.2	0.2
REGION				
Northeast	21.7	25.7	25.7	21.7
Southeast	23.4	22.5	22.5	23.4
Central	25.0	21.4	21.4	25.0
West	30.0	30.4	30.4	30.0
PARENT'S EDUCATION				
Less Than High School	3.9	3.8	3.8	3.9
High School	12.5	12.2	12.2	12.5
Greater Than High School	7.1	7.9	7.9	7.1
Graduated College	42.7	45.0	45.0	42.7
Unknown	33.1	30.6	30.6	33.1
Type Of Location				
Central City	42.3	43.0	43.0	42.3
Urban Fringe/Large Town	32.4	34.3	34.3	32.4
Rural/Small Town	25.4	22.7	22.7	25.4
SCHOOL TYPE				
Public	86.8	86.3	86.3	86.8
Nonpublic	12.9	13.4	13.4	12.9
Private	4.0	3.8	3.8	4.0
Catholic	8.9	9.5	9.5	8.9
BIA	0.3	0.3	0.3	0.3
DODEA	0.0	0.0	0.0	0.0

[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-35

Weighted Percentage of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,360,572	2,128,872	2,128,872	3,360,572
GENDER				
Male	48.5	45.2	45.2	48.5
Female	51.5	54.8	54.8	51.5
RACE/ETHNICITY				
White	68.6	68.0	68.0	68.6
Black	14.3	14.7	14.7	14.3
Hispanic	12.2	11.3	11.3	12.2
Asian American	3.6	4.4	4.4	3.6
American Indian	1.3	1.4	1.4	1.3
Unclassified	0.1	0.1	0.1	0.1
REGION				
Northeast	22.0	25.0	25.0	22.0
Southeast	24.9	22.9	22.9	24.9
Central	23.1	21.9	21.9	23.1
West	30.0	30.2	30.2	30.0
PARENT'S EDUCATION				
Less Than High School	5.5	4.3	4.3	5.5
High School	22.7	22.1	22.1	22.7
Greater Than High School	16.7	18.7	18.7	16.7
Graduated College	45.0	46.7	46.7	45.0
Unknown	9.7	7.9	7.9	9.7
TYPE OF LOCATION				
Central City	35.7	36.2	36.2	35.7
Urban Fringe/Large Town	35.9	38.1	38.1	35.9
Rural/Small Town	28.3	25.6	25.6	28.3
SCHOOL TYPE				
Public	88.8	88.2	88.2	88.8
Nonpublic	11.2	11.8	11.8	11.2
Private	4.5	5.1	5.1	4.5
Catholic	6.7	6.7	6.7	6.7
BIA	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0

[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-36

Weighted Percentage of Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17[1]

	Age	Grade	Age and Grade	Age or Grade
TOTAL	3,185,309	2,250,256	2,250,256	3,185,309
GENDER				
Male	49.5	47.0	47.0	49.5
Female	50.5	53.0	53.0	50.5
RACE/ETHNICITY				
White	69.3	73.8	73.8	69.3
Black	14.5	12.6	12.6	14.5
Hispanic	11.6	9.7	9.7	11.6
Asian American	3.5	3.0	3.0	3.5
American Indian	0.8	0.7	0.7	0.8
Unclassified	0.2	0.2	0.2	0.2
REGION				
Northeast	23.4	24.1	24.1	23.4
Southeast	22.4	22.1	22.1	22.4
Central	24.5	24.2	24.2	24.5
West	29.7	29.6	29.6	29.7
PARENT'S EDUCATION				
Less Than High School	6.4	4.4	4.4	6.4
High School	20.9	19.6	19.6	20.9
Greater Than High School	23.8	24.4	24.4	23.8
Graduated College	46.0	49.2	49.2	46.0
Unknown	2.0	1.5	1.5	2.0
TYPE OF LOCATION				
Central City	36.9	35.3	35.3	36.9
Urban Fringe/Large Town	37.9	39.4	39.4	37.9
Rural/Small Town	25.1	25.3	25.3	25.1
SCHOOL TYPE				
Public	91.4	90.7	90.7	91.4
Nonpublic	8.6	9.3	9.3	8.6
Private	3.5	3.7	3.7	3.5
Catholic	5.1	5.6	5.6	5.1
BIA	0.0	0.0	0.0	0.0
DODEA	0.0	0.0	0.0	0.0

[1] Note: Since this is an age-only sample, the number of students who are age-eligible only will be the same as the number of students who are age- *or* grade-eligible. Likewise, the number of students who are grade-eligible only will be the same as the number of students who are both age- *and* grade-eligible.

Table 19-37

Weighted Percentage of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9/Grade 4

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	61.2	63.6	57.7	64.0
Female	38.8	36.4	42.3	36.0
RACE/ETHNICITY				
White	48.3	57.6	42.7	57.5
Black	18.3	16.9	14.9	17.8
Hispanic	24.3	19.0	30.1	18.5
Asian American	7.6	4.7	10.4	4.5
American Indian	0.8	1.6	1.3	1.4
Unclassified	0.7	0.1	0.6	0.2
REGION				
Northeast	9.4	13.1	7.8	12.9
Southeast	26.9	36.4	23.5	35.8
Central	17.9	18.5	11.7	19.7
West	45.7	32.0	57.0	31.5
TYPE OF LOCATION				
Central City	50.2	42.8	55.0	42.8
Urban Fringe/Large Town	34.5	28.7	36.7	29.1
Rural/Small Town	15.3	28.5	8.3	28.1
SCHOOL TYPE				
Public	98.4	99.7	98.7	99.4
Nonpublic	1.3	0.3	1.3	0.4
Private	0.0	0.0	0.0	0.0
Catholic	1.3	0.3	1.3	0.4
BIA	0.0	0.0	0.0	0.0
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	106,503	266,020	64,398	308,125

Table 19-38

Weighted Percentage of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13/Grade 8

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	68.4	67.3	77.6	66.8
Female	31.6	32.7	22.4	33.2
RACE/ETHNICITY				
White	57.5	69.5	60.5	66.6
Black	18.4	13.5	9.6	15.4
Hispanic	17.8	13.1	23.4	13.7
Asian American	3.4	1.2	3.7	1.6
American Indian	2.4	2.6	2.8	2.5
Unclassified	0.4	0.0	0.0	0.1
REGION				
Northeast	20.3	17.4	21.8	17.9
Southeast	34.1	32.9	23.1	34.1
Central	15.1	28.6	15.4	25.6
West	30.4	21.1	39.7	22.4
TYPE OF LOCATION				
Central City	45.4	40.0	41.3	41.5
Urban Fringe/Large Town	26.7	21.2	39.4	21.4
Rural/Small Town	27.9	38.8	19.4	37.1
SCHOOL TYPE				
Public	96.8	96.9	97.4	96.8
Nonpublic	1.3	0.5	0.0	0.8
Private	0.9	0.5	0.0	0.7
Catholic	0.4	0.0	0.0	0.1
BIA	1.9	2.6	2.6	2.4
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	87,533	223,797	24,049	287,281

Table 19-39

Weighted Percentage of Excluded Students in the Reading and Writing Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17/Grade 11

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	64.4	66.7	47.6	67.9
Female	35.6	33.3	52.4	32.1
RACE/ETHNICITY				
White	61.1	67.6	71.3	64.1
Black	23.1	14.0	19.4	17.6
Hispanic	11.7	12.3	6.4	12.7
Asian American	2.7	3.2	0.6	3.3
American Indian	0.9	2.9	2.3	2.0
Unclassified	0.5	0.0	0.0	0.2
REGION				
Northeast	15.0	25.0	23.7	20.5
Southeast	36.5	23.1	26.4	29.0
Central	19.9	19.5	18.1	19.9
West	28.6	32.3	31.8	30.6
TYPE OF LOCATION				
Central City	29.6	30.9	26.3	30.8
Urban Fringe/Large Town	38.3	46.3	52.2	41.8
Rural/Small Town	32.2	22.9	21.6	27.4
SCHOOL TYPE				
Public	100.0	97.8	100.0	98.6
Nonpublic	0.0	0.6	0.0	0.4
Private	0.0	0.0	0.0	0.0
Catholic	0.0	0.6	0.0	0.4
BIA	0.0	1.7	0.0	1.1
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	121,771	167,734	29,838	259,667

Table 19-40

Weighted Percentage of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 9

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	62.0	61.0	61.0	62.0
Female	38.0	39.0	39.0	38.0
RACE/ETHNICITY				
White	47.5	46.4	46.4	47.5
Black	19.5	13.2	13.2	19.5
Hispanic	25.4	30.7	30.7	25.4
Asian American	6.5	8.8	8.8	6.5
American Indian	0.3	0.3	0.3	0.3
Unclassified	0.8	0.6	0.6	0.8
REGION				
Northeast	12.0	11.7	11.7	12.0
Southeast	33.2	22.6	22.6	33.2
Central	18.0	15.6	15.6	18.0
West	36.8	50.0	50.0	36.8
TYPE OF LOCATION				
Central City	54.8	61.0	61.0	54.8
Urban Fringe/Large Town	27.2	30.0	30.0	27.2
Rural/Small Town	18.0	9.0	9.0	18.0
SCHOOL TYPE				
Public	98.5	99.2	99.2	98.5
Nonpublic	1.5	0.8	0.8	1.5
Private	0.0	0.0	0.0	0.0
Catholic	1.5	0.8	0.8	1.5
BIA	0.0	0.0	0.0	0.0
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	173,491	91,294	91,294	173,491

Table 19-41

Weighted Percentage of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 13

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	64.6	59.0	59.0	64.6
Female	35.4	41.0	41.0	35.4
RACE/ETHNICITY				
White	54.4	55.9	55.9	54.4
Black	20.1	14.1	14.1	20.1
Hispanic	21.2	26.9	26.9	21.2
Asian American	3.4	2.8	2.8	3.4
American Indian	0.3	0.3	0.3	0.3
Unclassified	0.5	0.0	0.0	0.5
REGION				
Northeast	19.9	23.1	23.1	19.9
Southeast	31.5	24.1	24.1	31.5
Central	21.0	19.0	19.0	21.0
West	27.6	33.8	33.8	27.6
TYPE OF LOCATION				
Central City	44.2	36.8	36.8	44.2
Urban Fringe/Large Town	25.9	38.3	38.3	25.9
Rural/Small Town	30.0	24.9	24.9	30.0
SCHOOL TYPE				
Public	99.6	100.0	100.0	99.6
Nonpublic	0.4	0.0	0.0	0.4
Private	0.4	0.0	0.0	0.4
Catholic	0.0	0.0	0.0	0.0
BIA	0.0	0.0	0.0	0.0
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	146,608	43,419	43,419	146,608

Table 19-42

Weighted Percentage of Excluded Students in the Mathematics and Science Long-Term Trend Sample by Type of Eligibility and Subgroup Classification, Age 17

	Eligible by			
	Age	Grade	Age & Grade	Age or Grade
SEX				
Male	67.4	62.0	62.0	67.4
Female	32.6	38.0	38.0	32.6
RACE/ETHNICITY				
White	61.0	71.0	71.0	61.0
Black	18.6	16.1	16.1	18.6
Hispanic	15.4	10.8	10.8	15.4
Asian American	4.0	1.7	1.7	4.0
American Indian	1.0	0.4	0.4	1.0
Unclassified	0.0	0.0	0.0	0.0
REGION				
Northeast	22.1	36.4	36.4	22.1
Southeast	30.5	16.8	16.8	30.5
Central	17.9	17.6	17.6	17.9
West	29.6	29.2	29.2	29.6
TYPE OF LOCATION				
Central City	37.3	33.4	33.4	37.3
Urban Fringe/Large Town	36.3	47.7	47.7	36.3
Rural/Small Town	26.4	18.9	18.9	26.4
SCHOOL TYPE				
Public	98.6	100.0	100.0	98.6
Nonpublic	1.4	0.0	0.0	1.4
Private	1.4	0.0	0.0	1.4
Catholic	0.0	0.0	0.0	0.0
BIA	0.0	0.0	0.0	0.0
DoDea	0.0	0.0	0.0	0.0
ESTIMATED TOTAL POPULATION	131,897	38,085	38,085	131,897

Appendix A

PARTICIPANTS IN THE OBJECTIVES AND ITEM DEVELOPMENT PROCESS

The National Assessment of Educational Progress extends its deep appreciation to all those individuals who participated in the development of the framework, objectives, and items for the 1996 national assessment.

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Appendix B

REPORTING SUBGROUPS FOR THE 1996 NAEP ASSESSMENT

Results for the 1996 assessment were reported for student subgroups defined by gender, race/ethnicity, type of location, parents' level of education, participation in the National School Lunch Program, eligibility of Title I funding, and geographical region. The following explains how each of these subgroups was derived.

DSEX (Gender)

The variable SEX is the gender of the student being assessed, as taken from school records. For a few students, data for this variable was missing and was imputed by ETS after the assessment. The resulting variable DSEX contains a value for every student and is used for gender comparisons among students.

DRACE (Race/Ethnicity for Main and Long-Term Trend Assessments)

The variable DRACE is an imputed definition of race/ethnicity, derived from up to three sources of information. This variable is used for race/ethnicity subgroup comparisons in the 1996 main assessments (science and mathematics), in the 1996 long-term trend samples (reading, mathematics, and science), and in the 1996 writing trend samples (see also "observed race/ethnicity" below). Two items from the student demographics questionnaire were used in the determination of derived race/ethnicity:

Demographic Item Number 2:

2. If you are Hispanic, what is your Hispanic background?

○ I am not Hispanic.
○ Mexican, Mexican American, or Chicano
○ Puerto Rican
○ Cuban
○ Other Spanish or Hispanic background

Students who responded to Item Number 2 by filling in the second, third, fourth, or fifth oval were considered Hispanic. For students who filled in the first oval, did not respond to the item, or provided information that was illegible or could not be classified, responses to item number 1 were examined in an effort to determine race/ethnicity. Item Number 1 read as follows:

Demographic Item Number 1:

1. Which best describes you?
   - ○ White (not Hispanic)
   - ○ Black (not Hispanic)
   - ○ Hispanic ("Hispanic" means someone who is Mexican, Mexican American, Chicano, Puerto Rican, Cuban, or from some other Spanish or Hispanic background.)
   - ○ Asian or Pacific Islander ("Asian or Pacific Islander" means someone who is Chinese, Japanese, Korean, Filipino, Vietnamese, or from some other Asian or Pacific Island background.)
   - ○ American Indian or Alaskan Native ("American Indian or Alaskan Native" means someone who is from one of the American Indian tribes, or one of the original people of Alaska.)
   - ○ Other (What?) _________

Students' race/ethnicity was then assigned to correspond with their selection. For students who filled in the sixth oval (Other), provided illegible information or information that could not be classified, or did not respond at all, race/ethnicity as provided from school records was used. Derived race/ethnicity could not be determined for students who did not respond to background items 1 or 2 and for whom race/ethnicity was not provided by the school.

RACE (Observed Race/Ethnicity)

The variable RACE is the race/ethnicity of the student being assessed as observed and recorded by the exercise administrator. Observed race/ethnicity was used in NAEP assessments before 1984 (see also "self-identified race/ethnicity" above). Observed race/ethnicity is used for all race/ethnicity subgroup trend comparisons for which the starting long-term trend point comes from pre-1984 assessment data.

TOL8 (Type of Location)
TOL5
TOL3

The variable TOL8 is used by NAEP to provide information about the type of location in which schools are located. The variable is defined using population size information from the 1990 Census and the definitions of Metropolitan Statistical Areas (MSAs) as of June 1995. There are eight categories for TOL8:

1	Large Central City	a central city of an MSA with a population greater than or equal to 400,000, or a population density greater than or equal to 6,000 persons per square mile
2	Midsize Central City	a central city of an MSA but not designated as a large city
3	Urban Fringe of Large City	a place within an MSA of a large central city and defined as urban by the U.S. Bureau of Census
4	Urban Fringe of a Midsize City	a place within an MSA of a midsize central city and defined as urban by the U.S. Bureau of Census
5	Large Town	a place not within an MSA, but with a population greater than or equal to 25,000 and defined as urban by the U.S. Bureau of Census
6	Small Town	a place not within an MSA, with a population less than 25,000, but greater than or equal to 2,500 and defined as urban by the U.S. Bureau of Census
7	Rural MSA	a place within an MSA with a population of less than 2,500 and defined as rural by the U.S. Bureau of Census
8	Rural NonMSA	a place not within an MSA with a population of less than 2,500 and defined as rural by the U.S. Bureau of Census

These categories are designed to be exhaustive and mutually exclusive. Every place in the 50 United States and the District of Columbia is classified as belonging to exactly one of these categories. The definitions of MSAs and PMSAs, and their central cities, are carried out by the Office of Management and Budget (OMB). OMB Bulletin No. 93-17 states that "all agencies that conduct statistical activities to collect and publish data for Metropolitan Areas should use the most recent definitions of Metropolitan Areas established by OMB." The definitions used (as of June 1995) were those current at the time of the 1996 assessment. The definitions of places and their populations are obtained from the published results of the 1990 Population Census, as are the definitions of Urbanized Areas.

Further details about the creation of the eight-category type of location variable are provided in *The NAEP 1994 Sampling and Weighting Report* (Wallace & Rust, 1996).

The variable TOL5 was created by collapsing the information provided in the variable TOL8 to five levels:

1 Large Central City
2 Midsize Central City
3 Urban Fringe of Large City, Urban Fringe of Midsize City, and Large Town
4 Small Town
5 Rural MSA and Rural NonMSA

The variable TOL3 is used extensively in the NAEP reports. TOL3 collapses TOL8 to three levels:

1	Central City	(Large Central City and Midsize Central City) This category includes central cities of all MSAs. Central City is a geographic term and is not synonymous with "inner city."
2	Urban Fringe/Large Town	(Urban Fringe of Large City, Urban Fringe of Midsize City, and Large Town) An Urban Fringe includes all densely settled places and areas within MSAs that are classified as urban by the Bureau of Census. A Large Town is defined as a place outside MSAs with a population greater than or equal to 25,000.
3	Rural/Small Town	(Small Town, Rural MSA, and Rural NonMSA) Rural includes all places and areas with a population of less than 2,500 that are classified as rural by the Bureau of Census. A Small Town is defined as a place outside MSAs with a population of less than 25,000 but greater than or equal to 2,500.

PARED (Student's Report of Parents' Education Level)

The variable PARED is derived from responses to two questions, B003501 and B003601, in the student demographic questionnaire. Each student was asked to indicate the extent of his or her mother's education (B003501—How far in high school did your mother go?) by choosing one of the following:

○ She did not finish high school.
○ She graduated from high school.
○ She had some education after high school.
○ She graduated from college.
○ I don't know.

Each student was asked to provide the same information about the extent of his or her father's education (B003601—How far in high school did your father go?) by choosing one of the following:

○ He did not finish high school.
○ He graduated from high school.
○ He had some education after high school.
○ He graduated from college.
○ I don't know.

The information was combined into one parental education reporting category (PARED) as follows: If a student indicated the extent of education for only one parent, that level was included in the data. If a student indicated the extent of education for both parents, the higher of the two levels was included in the data. For students who did not know the level of education for both parents or did not know the level of education for one parent and did not respond for the other, the parental education level was classified as unknown. If the student did not respond for both parents, the student was recorded as having provided no response.

REGION (Region of the Country)

Jurisdictions were grouped into four geographical regions—Northeast, Southeast, Central, and West—as shown in Table B-1. All 50 states and the District of Columbia are listed. The part of Virginia that is included in the Washington, DC, metropolitan statistical area is included in the Northeast region; the remainder of the state is included in the Southeast region.

Table B-1
NAEP Geographic Regions

NORTHEAST	SOUTHEAST	CENTRAL	WEST
Connecticut	Alabama	Illinois	Alaska
Delaware	Arkansas	Indiana	Arizona
District of Columbia	Florida	Iowa	California
Maine	Georgia	Kansas	Colorado
Maryland	Kentucky	Michigan	Hawaii
Massachusetts	Louisiana	Minnesota	Idaho
New Hampshire	Mississippi	Missouri	Montana
New Jersey	North Carolina	Nebraska	Nevada
New York	South Carolina	North Dakota	New Mexico
Pennsylvania	Tennessee	Ohio	Oklahoma
Rhode Island	Virginia	South Dakota	Oregon
Vermont	West Virginia	Wisconsin	Texas
Virginia			Utah
			Washington
			Wyoming

MODAGE (Modal Age)

The modal age (the age of most of the students in the grade sample) for the fourth-grade students is age 9 (age 13 for grade 8 and age 17 for grade 12). A value of 1 for MODAGE indicates that the student is younger than the modal age; a value of 2 indicates that the student is of the modal age; a value of 3 indicates that the student is older than the modal age.

IEP (Individualized Education Program)[1]

The variable IEP comes from the student booklet cover. A value of 1 indicates that a student has an individualized education program, while a value of 2 indicates no individualized education program.

LEP (Limited English Proficiency)

The variable LEP comes from the student booklet cover. A value of 1 indicates that a student is considered to have limited English proficiency while a value of 2 indicates that the student does not have limited English proficiency.

TITLE1

The variable TITLE1 comes from the student booklet cover. A value of 1 indicates that a student is eligible for Title 1 funding and a value of 2 indicates that the student is not eligible for Title 1 funding.

SLUNCH
SLUNCH1

The variable SLUNCH is provided by Westat, Inc. and is used to determine if a student participates in the National School Lunch Program. The values for this variable are as follow:

1 not eligible
2 eligible for reduced price lunch
3 eligible for free lunch
4 no information available
5 school refused to provide information

The variable SLUNCH1 collapses the information provided in the variable SLUNCH to three levels:

1 eligible for free or reduced price lunch
2 not eligible for free or reduced price lunch
3 no information available

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[1] A student identified on the Administration Schedule as a student with a disability (SD) or an equivalent classification may be excluded from the assessment if: 1) the student is mainstreamed less than 50% of the time in academic subjects and is judged incapable of participating meaningfully in the assessment, or 2) the Individualized Education Program (IEP) team or equivalent group has determined that the student is incapable of participating meaningfully in the assessment. SD/LEP students meeting the above criteria should be assessed if, in the judgment of school staff, they are capable of taking the assessment.

SCHTYPE

The variable SCHTYPE is provided by Westat, Inc., and is used to determine the type of school that a student attended. The values for this variable are as follow:

1 Public
2 Private
3 Catholic
4 Bureau of Indian Affairs (BIA)
5 Department of Defense Education Activity (DoDEA) schools

VARIABLES DERIVED FROM THE STUDENT AND TEACHER QUESTIONNAIRES

Several variables were formed from the systematic combination of response values for one or more items from either the student demographic questionnaire, the student background questionnaire, or the teacher questionnaire.

HOMEEN2 (Home Environment—Articles [of 4] in the Home) - Science

For the science sample the variable HOMEEN2 was created from the responses to student demographic items B000901 (Does your family get a newspaper regularly?), B000903 (Is there an encyclopedia in your home?), B000904 (Are there more than 25 books in your home?), and B000905 (Does your family get any magazines regularly?). The values for this variable were derived as follows:

1	0-2 types	The student responded to at least two items and answered "yes" to two or fewer.
2	3 types	The student answered "yes" to three items.
3	4 types	The student answered "yes" to four items.
8	Omitted	The student answered fewer than two items.

HOMEEN3 (Home Environment—Articles [of 4] in the Home) - Mathematics

For the mathematics samples the variable HOMEEN3 was created from the responses to student demographic items B000901 (Does your family get a newspaper regularly?), B000903 (Is there an encyclopedia in your home?), B008801 (How many books are in your home?), collapsed to indicate whether or not there are more than 25 books in the home), and B000905 (Does your family get any magazines regularly?). The values for this variable were derived as follows:

1	0-2 types	The student responded to at least two items and answered "yes" to two or fewer.
2	3 types	The student answered "yes" to three items.
3	4 types	The student answered "yes" to four items.
8	Omitted	The student answered fewer than two items.

NCOMP (Number of Computer Science Courses Taken)

For age class 17 (long-term trend mathematics and science), NCOMP was created from responses to items B005312 and B005313 concerning the student's coursework in computer science. The values for NCOMP were derived as follows:

1	0	The student answered HAVE NOT to both courses.
2	1	The student answered HAVE to one course.
3	2	The student answered "yes" to both courses.
8	No response	The student did not respond to one or both items.
9	Mult. & out-of-range	The student filled in more than one oval for both items.

NMATH (Highest Level of Mathematics Courses Taken)

For age class 17, long-term trend mathematics and science) NMATH was created from responses to items B005301 through B005307 concerning the student's coursework in mathematics. The values for NMATH were derived as follows:

1	Gen. mathematics or pre-algebra	The student answered HAVE NOT to all items or HAVE to B005301 or B005302 and HAVE NOT to all others.
2	Algebra	The student answered HAVE to B005303 and HAVE NOT to B005304, B005305, B005306, and B005307.
3	Geometry	The student answered HAVE to both B005303 and B005305 and HAVE NOT to B005304, B005306, and B005307.
4	Algebra 2	The student answered HAVE to B005304 or B005306 but HAVE NOT to B005307.
5	Calculus	The student answered HAVE to B005307.
6	Something else	Any other response combination
8	No response	The student did not respond to any item.

NSCI (Highest Level of Science Courses Taken)

For age class 17, (long-term trend mathematics and science) NSCI was created from responses to items B005308 through B005311, which concerned the student's coursework in science. The values for NSCI were derived as follows:

1	No biology	The student answered HAVE NOT to all items or HAVE to B005308 and other than HAVE to all other items.
2	Biology	The student answered HAVE to B005309 and other than HAVE to both B005310 and B005311.
3	Chemistry	The student answered HAVE to both B005309 and B005310 and other than HAVE to B005311.
4	Physics	The student answered HAVE to B005309, B005310, and B005311.
5	Something else	Any other response combination
8	No response	The student answered none of the items.

VARIABLES DERIVED FROM COGNITIVE ITEMS

BKSCOR (Booklet-Level Score)

The booklet-level score is a student-level score based on the sum of the number correct for dichotomous items plus the sum of the scores on the polytomous items, where the score for a polytomous item starts from 0 for the unacceptable category. Thus, for a 4-point extended constructed-response item, scores of "no response", "off-task", and "unsatisfactory" are assigned an item score of 0. Scores of "partial," "essential," and "extensive" are assigned item scores of 1, 2, and 3, respectively. The score is computed based on all cognitive items in a student's assessment booklet.

LOGIT (Logit Percent Correct Within Booklet)

In order to compute the LOGIT score, a percent correct within booklet was first computed. This score was based on the ratio of the booklet score (BKSCOR) over the maximum booklet score. The percent correct score was set to .0001 if no items were answered correctly; if BKSCOR equaled the maximum booklet score, the percent correct score was set to .9999. A logit score, LOGIT, was calculate for each student by the following formula:

$$LOGIT = ln\left[\frac{PCTCOR}{1 - PCTCOR}\right]$$

A logit score, LOGIT, was calculated within booklet for each student by the following formula: LOGIT was then truncated to a value x, such that $-3 \leq x \leq 3$. After computing LOGIT for each student, the mean and standard deviation were calculated for each booklet as the first step in standardizing the logit scores. The standardized logit score, ZLOGIT, was then calculated for each student by the following formula:

$$ZLOGIT = \left[\frac{LOGIT - mean\ logit}{standard\ deviation}\right]$$

NORMIT (Normit Gaussian Score)
SCHNORM (School-Level Mean Gaussian Score)

The normit score is a student-level Gaussian score based on the inverse normal transformation of the mid-percentile rank of a student's number-correct booklet score within that booklet. The normit scores were used to decide collapsing of variables, finalize conditioning coding, and check the results of scaling.

The number correct is based on the number of dichotomous items answered correctly plus the score obtained on extended constructed-response items. The mid-percentile rank is based on the formula:

$$\frac{CF(i)+CF(i-1)}{2N}$$

where CF(i) is the cumulative frequency at i items correct and N is the total sample size. If $i = 0$ then

$$\frac{CF(0)+\frac{CF(1)}{2}}{2N}$$

A school-level normit, SCHNORM, was also created; this was the mean normit across all reading booklets administered in a school. These school-level mean normit scores were used in conditioning procedures to take into account differences in school proficiency. For each school, the weighted mean of the logits for the students in that school was calculated. Each student was then assigned that mean as his or her school-level mean logit score value.

VARIABLES RELATED TO PROFICIENCY SCALING

Proficiency Score Variables

Item response theory (IRT) was used to estimate average proficiency for the nation and for various subpopulations, based on students' performance on the set of cognitive items they received. IRT provides a common scale on which performance can be reported for the nation and subpopulations, even when all students do not answer the same set of questions. This common scale makes it possible to report on relationships between students' characteristics (based on their responses to the background questions) and their overall performance in the assessment.

A scale ranging from 1 to 500 or from 1 to 300 was created to report performance for each content area or strand. A composite scale was created based on a weighted average of scales, where the weight for each content area or strand was proportional to the relative importance assigned to the content area as specified in the mathematics and science objectives.

Scale proficiency estimates were obtained for all students. The NAEP methods use random draws (plausible values) from estimated proficiency distributions to compute population statistics. Plausible values are not optimal estimates of individual proficiency; instead, they serve as intermediate values to be used in estimating population characteristics. Chapter 11 provides further details on the computation and use of plausible values. Chapters 12-18 provide additional information as appropriate to each sample/subject area.

The proficiency score (plausible value) variables are provided on the student data files for each of the scales and are named as shown in Table B-2.

Table B-2

Scaling Variables for the 1996 National Assessment Samples

Sample	Scale	Data Variables
Mathematics Main	Number Sense, Properties, and Operations	MRPS11 to MRPS15
	Measurement	MRPS21 to MRPS25
	Geometry and Spatial Sense	MRPS31 to MRPS35
	Data Analysis, Statistics, and Probability	MRPS41 to MRPS45
	Algebra and Functions	MRPS51 to MRPS55
	Composite	MRPCM1 to MRPCM5
Science Main	Physical Science	SRPS11 to SRPS15
	Earth Science	SRPS21 to SRPS25
	Life Science	SRPS31 to SRPS35
	Composite	SRPCM1 to SRPCM5
Reading Long-Term Trend	Univariate	REDVAL1 to REDVAL5
Writing Long-Term Trend	Univariate	WRPSCT1 to WRPSCT5
Mathematics Long-Term Trend	Univariate	MRPSCT1 to MRPSCT5
Science Long-Term Trend	Univariate	SRPSCT1 to SRPSCT5

SMEANx, SMNx1 (School Mean Score Using First Plausible Value)
SRANKx, SRNKx1 (School Rank Using First Plausible Value)
SRNK3x, SRK3x1 (Top, Middle, Bottom Third Using First Plausible Value
where x = M or S for Science or Mathematics)

A mean composite score (SMEANx on the student files, SMNx1 on the school files) was calculated using the first composite plausible value for each school within each grade/subject area. The mean composite score was based on the values from the scaling variable xRPCM1 and was calculated using the students' sampling weights. The schools were then ordered from highest to lowest mean score (SRANKx on the student files, SRNKx1 on the school files) within a sample using school-level weights —the school with the highest mean score was given a ranking of 1, and the school with the lowest mean score was given a ranking equal to the number of schools in the sample.

These variables were then used in partitioning the schools within the national grade sample into three groups (top third, middle third, and bottom third) based on their ranking (SRNK3x on the student files, SRK3x1 on the school files).

SMNxn (School Mean Score Using Plausible Values 2 Through 5)
SRNKxn (School Rank Using Plausible Values 2 Through 5)
SRK3xn (Top, Middle, Bottom Third Using Plausible Values 2 Through 5)
SMNRPn (School Mean Score Using Plausible Values 2 Through 5, Public Schools Only)

School ranking results presented in the 1996 NAEP reports are based on the first plausible value. However, since there are four additional estimates of proficiency (plausible values) for each student, school ranking data were also created for those estimates. These school rank values were created using the same procedures described above, substituting proficiency variables xRPCM2 through xRPCM5 to compute the results. In the variable names, n denotes the plausible value 2, 3, 4, or 5.

QUALITY EDUCATION DATA VARIABLES (QED)

The data files contain several variables obtained from information supplied by Quality Education Data, Inc. (QED). QED maintains and annually updates lists of schools showing grade span, total enrollment, instructional dollars per pupil, and other information for each school. These data variables are retained on both the school and student files and are identified in the data layouts by "(QED)" in the SHORT LABEL field.

Most of the QED variables are defined sufficiently in the data codebooks. Explanations of others are provided below.

ORSHPT is the Orshansky Percentile, an indicator of relative wealth that specifies the percentage of school-age children in a district who fall below the poverty line.

IDP represents, at the school district level, dollars per student spent for textbooks and supplemental materials. The range code for instructional dollars spent per pupil excluding teacher salaries are:

0 = Unclassified
1 = Under $10
2 = $10-49
3 = $50-99
4 = $100-149
5 = $150-299
6 = $300-399
7 = $400-499
8 = $500-999
9 = $1000 +

ADULTED indicates whether or not adult education courses are offered at the school site.

URBAN defines the school's urbanization: urban (central city); suburban (area surrounding central city, but still located within the counties constituting the metropolitan statistical area); or rural (area outside any metropolitan statistical area).

Appendix C

CONDITIONING VARIABLES AND CONTRAST CODINGS

This appendix contains information about the conditioning variables used in scaling/plausible value estimation for the 1996 NAEP assessment. The initial step in construction of conditioning variables involves forming primary student-based vectors of response data from answers to student, teacher, and school questionnaires, demographic and background data such as supplied by Westat, Inc., and other student information known prior to scaling. The initial conditioning vectors concatenate this student background information into a series of identifying "contrasts" comprising:

1. Categorical variables derived by expanding the response options of a questionnaire variable into a binary series of one-degree-of-freedom "dummy" variables or contrasts, (these form the majority of each student conditioning vector);

2. Questionnaire or demographic variables that possess ordinal response options, such as number of hours spent watching television, which are included as linear and/or quadratic multi-degree-of-freedom contrasts;

3. Continuous variables, such as student logit scores based on percent correct values, included as contrasts in their original form or a transformation of their original form, and;

4. Interactions of two or more categorical variables forming a set of orthogonal one-degree-of-freedom dummy variables or contrasts.

This appendix gives the specifications used for constructing the conditioning variables. Table C-1 defines the information provided for each main sample variable. Table C-2 provides a summary of the mathematics conditioning variables specifications that are contained in the remainder of this appendix. Table C-3 provides a summary of the science conditioning variables specifications that are contained in the remainder of this appendix. Conditioning variable data specific to each subject area is shown for main mathematics in Table C-4 and for science in Table C-5. Similar information for long-term trend samples is given in Tables C-6, C-7, C-8, and C-9 respectively for reading, mathematics, science, and writing.

As described in Chapter 9, the linear conditioning model employed for the estimation of plausible values did not directly use the conditioning variable specifications listed in this appendix. To eliminate inherent instabilities in estimation encountered when using a large number of correlated variables, a principal component transformation of the correlation matrix obtained from the conditioning variable contrasts derived according to these primary specifications was performed. The principal components scores based on this transformation were used as the predictor variables in estimating the linear conditioning model. The proportions of variance of the conditioning contrast accounted for by the principal components are given for each age/grade level in Tables C-10, C-11, and C-12 for mathematics, and Tables C-13, C-14, and C-15 for science.

Table C-1

Description of Specifications Provided for Each Conditioning Variable

Title	Description
CONDITIONING ID	A unique eight-character ID assigned to identify each conditioning variable corresponding to a particular background or subject area question within the entire pool of conditioning variables. The first four characters identify the origin of the variable: BACK (background questionnaire), READ (student reading questionnaire), SCHL (school questionnaire), TCHR (background part of teacher questionnaire), and TSUB (subject classroom part of teacher questionnaire). The second four digits represent the sequential position within each origin group.
DESCRIPTION	A short description of the conditioning variable.
GRADES/ASSESSMENTS	Three characters identifying assessment ("S" for state, "N" for national) and grade (04, 08, and 12) in which the conditioning variable was used.
CONDITIONING VAR LABEL	A descriptive eight-character label identifying the conditioning variable.
NAEP ID	The seven-character NAEP database identification for the conditioning variable.
TYPE OF CONTRAST	The type of conditioning variable. "CLASS" identifies a categorical conditioning variable and "SCALE" identifies continuous or quasi-continuous conditioning variables. "INTERACTION" identifies a set of orthogonal contrasts formed from two or more "CLASS" variables. "OTHER" conditioning variables do not fall into any of the above types.
TOTAL NUMBER OF SPECIFIED CONTRASTS	Each conditioning variable forms a set of one or more contrasts. For each valid response value of conditioning variable a contrast must be defined. One or more response values may be collapsed together to form one contrast. The number of response value "sets" of a conditioning variable forming a unique contrast is the value given in this field.
NUMBER OF INDEPENDENT CONTRASTS	The number of degree of freedom in a set of contrasts formed from a conditioning variable. For a categorical conditioning variable this number would be the number of response options minus one if each response option formed its own unique contrast.

Table C-2

Summary Table of the 1996 Mathematics Assessment Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
BACK0001	BKSER		GRAND MEAN	X	X	X
BACK0002	DSEX		DERIVED SEX	X	X	X
BACK0003	DRACE		DERIVED RACE/ETHNICITY	X	X	X
BACK0004	B003101	TB003101	IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND?	X	X	X
BACK0005	TOL8		MSA/NON-MSA	X	X	X
BACK0006	TOL5		TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0007	DOC		DESCRIPTION OF COMMUNITY	X	X	X
BACK0008	PARED		PARENTS' HIGHEST LEVEL OF EDUCATION	X	X	X
BACK0009	REGION		REGION OF THE COUNTRY	X	X	X
BACK0010	SCHTYPE		SCHOOL TYPE (PQ)	X	X	X
BACK0011	IEP		INDIVIDUALIZED EDUCATION PROGRAM	X	X	X
BACK0012	LEP		LIMITED ENGLISH PROFICIENCY	X	X	X
BACK0013	TITLE1		TITLE 1 (BOOK COVER)	X	X	X
BACK0014	SLUNCH		DO YOU RECEIVE A FREE OR REDUCED-PRICE LUNCH?	X	X	X
BACK0015	B003201	TB003201	HOW OFTEN DO THE PEOPLE IN YOUR HOME SPEAK A LANGUAGE OTHER THAN ENGLISH?	X	X	X
BACK0016	B008901	HE002489	DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT HOME?	X	X	X
BACK0017	B001801	TB001801	HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (LINEAR)	X	X	X
BACK0018	B001801	TB001801	HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (QUADRATIC)	X	X	X
BACK0019	B006601	TB006601	HOMEWORK ASSIGNED?: BASED ON TIME SPENT ON HOMEWORK EACH DAY.	X	X	X
BACK0020	B006601	TB006601	HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY? (LINEAR)	X	X	X
BACK0021	B006601	TB006601	HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY (QUADRATIC)	X	X	X
BACK0022	HOMEEN2		NUMBER OF ITEMS IN THE HOME (NEWSPAPER, > 25 BOOKS, ENCYCLOPEDIA, MAGAZINES) (DERIVED)	X	X	X
BACK0023	B005601	TB005601	DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH YOU?	X	X	X
BACK0024	B005701	TB005701	DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU?	X	X	X
BACK0025	S004001	TS004001	HOW MANY DAYS OF SCHOOL MISSED LAST MONTH?	X	X	X
BACK0026	B008001	LC000006	HOW LONG LIVED IN THE UNITED STATES?	X	X	X
BACK0027	B007601	JL001015	HOW MANY GRADES IN THIS STATE? (4TH GRADE)	X	-	-
SCHL0001	SCHNORM		SCHOOL LEVEL AVERAGE MATH NORMIT (MISSING VS NON-MISSING)	X	X	X
SCHL0002	SCHNORM		SCHOOL LEVEL AVERAGE MATH NORMIT	X	X	X
BACK0028	B008301	LC000168	HOW MANY GRADES IN THIS STATE (12TH GRADE)	-	-	X
BACK0029	B007301	HE000712	HOW MANY TIMES HAVE YOU CHANGED SCHOOLS IN PAST TWO YEARS BECAUSE YOU MOVED?	X	X	X
BACK0030	B007401	HE000717	HOW OFTEN DO YOU DISCUSS THINGS STUDIED IN SCHOOL WITH SOMEONE AT HOME?	X	X	X
BACK0031	B001101	TB001101	ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?	X	X	X
BACK0032	B001101	TB001101	ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?	X	X	X
BACK0033	B008501	HE002549	WHICH BEST DESCRIBES YOUR HIGH-SCHOOL PROGRAM?	-	-	X
BACK0034	B007101	HE000333	SEMESTERS ENGLISH/LITERATURE/WRITING (MISSING VS NON-MISSING)	-	-	X
BACK0035	B007101	HE000333	NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING (LINEAR)	-	-	X
BACK0036	B007102	HE000334	SEMESTERS MATHEMATICS (MISSING VS NON-MISSING)	-	-	X
BACK0037	B007102	HE000334	NUMBER OF SEMESTERS MATHEMATICS (LINEAR)	-	-	X
BACK0038	B007103	HE000335	SEMESTERS SCIENCE (MISSING VS NON-MISSING)	-	-	X
BACK0039	B007103	HE000335	NUMBER OF SEMESTERS SCIENCE (LINEAR)	-	-	X
BACK0040	B007104	HE000336	SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (MISSING VS NON-MISSING)	-	-	X
BACK0041	B007104	HE000336	NUMBER OF SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (LINEAR)	-	-	X
SUBJ0001	MATTAKE		WHAT KIND OF MATH CLASS ARE YOU TAKING THIS YEAR?	-	X	-
BACK0042	B007105	HE000337	SEMESTERS FOREIGN LANGUAGES (MISSING VS NON-MISSING)	-	-	X
BACK0043	B007105	HE000337	NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)	-	-	X
BACK0044	B007106	HE000338	SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (MISSING VS NON-MISSING)	-	-	X
BACK0045	B007106	HE000338	NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (LINEAR)	-	-	X

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Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
BACK0046	B007107	TB007100	SEMESTERS ART/MUSIC (MISSING VS NON-MISSING)	-	-	X
BACK0047	B007107	TB007100	NUMBER OF SEMESTERS ART/MUSIC (LINEAR)	-	-	X
BACK0048	INTERACT		INTERACTION: GENDER BY RACE/ETHNICITY	X	X	X
BACK0049	INTERACT		INTERACTION: GENDER BY TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0050	INTERACT		INTERACTION: GENDER BY PARENTS' EDUCATION	X	X	X
BACK0051	INTERACT		INTERACTION: GENDER BY SCHOOL TYPE	X	X	X
BACK0052	INTERACT		INTERACTION: RACE/ETHNICITY BY TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0053	INTERACT		INTERACTION: RACE/ETHNICITY BY PARENTS' EDUCATION	X	X	X
BACK0054	INTERACT		INTERACTION: RACE/ETHNICITY BY SCHOOL TYPE	X	X	X
BACK0055	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY PARENT'S EDUCATION	X	X	X
BACK0056	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY SCHOOL TYPE	X	X	X
BACK0057	INTERACT		INTERACTION: PARENTS' EDUCATION BY SCHOOL TYPE	X	X	X
BACK0058	INTERACT		INTERACTION: GENDER BY MATH COURSES TAKING THIS YEAR	-	X	-
BACK0059	INTERACT		INTERACTION: GENDER BY NUMBER OF SEMESTERS MATH	-	-	X
BACK0060	INTERACT		INTERACTION: RACE/ETHNICITY BY MATH COURSES TAKING THIS YEAR	-	X	-
BACK0061	INTERACT		INTERACTION: RACE/ETHNICITY BY NUMBER OF SEMESTERS MATH	-	-	X
BACK0062	INTERACT		INTERACTION: PARENTS' EDUCATION BY MATH COURSES TAKING THIS YEAR	-	X	-
BACK0063	INTERACT		INTERACTION: PARENTS' EDUCATION BY NUMBER OF SEMESTERS MATH	-	-	X
BACK0064	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY MATH COURSES TAKING THIS YEAR	-	X	-
BACK0065	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY NUMBER OF SEMESTERS MATH	-	-	X
BACK0066	INTERACT		INTERACTION: SCHOOL TYPE BY MATH COURSES TAKING THIS YEAR	-	X	-
BACK0067	INTERACT		INTERACTION: SCHOOL TYPE BY NUMBER OF SEMESTERS MATH	-	-	X
BACK0068	MA93FLG		MSA/NON-MSA	-	-	-
BACK0069	MONSTUD		STATE ADMINISTRATION MONITORED/UNMONITORED SESSION	-	-	-
BACK0070	INTERACT		INTERACTION: SCHOOL TYPE BY MONITORED/UNMONITORED SESSION	-	-	-
BACK0071	SUBSAMP		SAMPLE TYPE	X	X	X
BACK0072	INTERACT		INTERACTION: SAMPLE BY RACE/ETHNICITY	X	X	X
BACK0073	RPTSAMP		REPORTING SAMPLE	X	X	X
BACK0074	B009301	HE002795	HOW OFTEN USE A HOME COMPUTER FOR SCHOOLWORK?	X	X	X
BACK0075	B009401	HE002541	HOW SAFE DO YOU FEEL AT SCHOOL?	X	X	X
BACK0076	B009501	HE003221	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	X	-	-
BACK0077	B009502	HE003222	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	X	-	-
SUBJ0002	M812701	TM810101	HOW OFTEN DO YOU DO MATH PROBLEMS FROM TEXTBOOK?	X	X	X
SUBJ0003	M812702	TM810102	HOW OFTEN DO YOU DO MATH PROBLEMS ON WORK SHEETS?	X	X	X
SUBJ0004	M812703	HE002478	HOW OFTEN SOLVE MATH PROBLEMS WITH PARTNER/GROUP?	X	X	X
SUBJ0005	M812704	TM810112	HOW OFTEN IN MATH WORK W/ RULERS, GEOM SHAPES?	X	-	-
SUBJ0006	M812705	TM810109	HOW OFTEN WRITE ABOUT SOLVING A MATH PROBLEM?	X	X	X
SUBJ0007	M812706	TM810107	HOW OFTEN DO YOU TAKE MATHEMATICS TESTS?	X	X	X
SUBJ0008	M812707	HE002479	HOW OFTEN DO YOU TALK TO THE CLASS RE MATH WORK?	X	X	X
SUBJ0009	M812708	HE002480	HOW OFTEN DO 10 OR MORE MATH PROBLEMS BY YOURSELF?	X	X	X
SUBJ0010	M812709	HE002481	HOW OFTEN DISCUSS MATH PROBLEMS W/ OTHER STUDENTS?	X	X	X
SUBJ0011	M812710	TM810106	HOW OFTEN DO YOU USE A COMPUTER FOR MATH?	X	X	X
SUBJ0012	M812711	TM810105	HOW OFTEN DO YOU USE A CALCULATOR FOR MATH?	X	X	X
SUBJ0013	M811201	HE000378	DO YOU HAVE CALCULATOR TO USE WITH MATH HOMEWORK?	X	X	X
SUBJ0014	M812001	LC000519	HOW OFTEN USE A CALCULATOR FOR MATH CLASSWORK?	X	X	X
SUBJ0015	M812002	LC000520	HOW OFTEN USE A CALCULATOR FOR MATH HOMEWORK?	X	X	X
SUBJ0016	M812003	LC000521	HOW OFTEN USE A CALCULATOR FOR MATH TESTS/QUIZZES?	X	X	X
SUBJ0017	M812101	TM810601	HOW MUCH TIME SPEND DAILY ON MATH HOMEWORK?	X	X	X

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Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SUBJ0018	M811401	HE000705	GET MATH HELP FROM SPECIAL TEACHER/AIDE/TUTOR?	X	-	-
SUBJ0019	M811101	TM811101	AGREE/DISAGREE: I LIKE MATH	X	-	-
SUBJ0020	M811103	TM811103	AGREE/DISAGREE: I AM GOOD AT MATH	X	-	-
SUBJ0021	M811106	HE000651	HOW MUCH AGREE-UNDERSTAND MOST OF MATH CLASS?	X	-	-
SUBJ0022	M811109	HE002482	HOW MUCH AGREE-ONLY 1 CORRECT WAY TO SOLVE PROB?	X	-	-
SUBJ0023	M811107	HE000654	HOW MUCH AGREE-LEARNING MATH IS MEMORIZING FACTS?	X	-	-
SUBJ0024	M811105	TM811105	AGREE/DISAGREE: MATH USED FOR SOLVING PROBLEMS	X	-	-
SUBJ0025	M811108	HE000367	HOW MUCH AGREE-IF CHOICE I WOULDN'T STUDY MORE?	X	-	-
SUBJ0026	M811110	LC000022	HOW MUCH AGREE-EVERYONE CAN DO WELL IF TRY?	X	-	-
SUBJ0027	MM00101	HE000782	ABOUT HOW MANY QUESTIONS RIGHT ON TEST?	X	X	X
SUBJ0028	MM00201	HE000783	HOW HARD TEST COMPARED TO THOSE IN SCHOOL?	X	X	X
SUBJ0029	MM00301	JL001008	HOW HARD DID YOU TRY ON TEST COMPARED TO OTHERS?	X	X	X
SUBJ0030	MM00401	JL001009	HOW IMPORTANT WAS IT YOU DO WELL ON THIS TEST?	X	X	X
SUBJ0031	MM00501	HE000784	HOW OFTEN HAD TO WRITE LONG ANSWERS TO QSTS?	X	X	X
BACK0078	B009701	HE002543	DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE	-	X	-
BACK0079	B009801	HE002544	HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?	-	X	-
BACK0080	B009601	HE003223	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	-	X	X
BACK0081	B009602	HE003224	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	-	X	X
SUBJ0032	M812712	TM810104	WORK W/ MEAS. INSTRUMENTS/GEOM SOLIDS FOR MATH?	-	X	X
SUBJ0033	M812713	TM810108	HOW OFTEN WRITE REPORTS OR DO MATH PROJECTS?	-	X	X
SUBJ0034	M812201	HE002483	IS THERE A PORTFOLIO W/ YOUR MATH WORK IN IT?	-	X	X
SUBJ0035	M812301	HE002484	DO YOU USE A SCIENTIFIC CALCULATOR FOR MATH WORK?	-	X	X
SUBJ0036	M812401	HE002485	DO YOU USE A GRAPHING CALCULATOR FOR MATH WOR	-	X	X
SUBJ0037	MATEXP		WHAT KIND OF MATH CLASS WILL YOU TAKE IN 9TH GR?	-	X	-
SUBJ0038	M810701	TM810701	DO YOU AGREE: I LIKE MATH	-	X	X
SUBJ0039	M810703	LD001476	DO YOU AGREE: I AM GOOD IN MATH	-	X	X
SUBJ0040	M810707	HE000369	AGREE/DISAGREE: UNDERSTAND MOST OF MATH CLASS	-	X	X
SUBJ0041	M810709	LD001473	AGREE/DISAGREE: ONLY ONE WAY TO SOLVE MATH PROBLEM	-	X	X
SUBJ0042	M810708	HE000631	AGREE/DISAGREE: MATH IS MOSTLY MEMORIZING FACTS	-	X	X
SUBJ0043	M810710	LD001474	AGREE/DISAGREE: CONCEPTS ARE AS IMPORTANT AS OPER	-	X	X
SUBJ0044	M810705	TM810705	DO YOU AGREE: MATH USEFUL/SOLVING EVERYDAY PROBLEM	-	X	X
SUBJ0045	M810706	HE000374	AGREE/DISAGREE: WOULD NOT STUDY MORE MATH	-	X	X
SUBJ0046	M810711	LD001475	AGREE/DISAGREE: ALL CAN DO WELL IN MATH IF	-	X	X
BACK0082	B008301	LC000168	SINCE KDG, GRADES ATTENDED IN THIS STATE?	-	-	X
BACK0083	B009901	HE002548	DESCRIBE YOUR OVERALL GRADES SINCE 9TH-GRADE	-	-	X
BACK0084	B008501	HE002549	WHICH BEST DESCRIBES YOUR HIGH SCHOOL PROGRAM	-	-	X
BACK0085	B005501	TB005501	WHAT WILL TAKE LARGEST AMT. OF TIME AFTER HIGH-SCH	-	-	X
BACK0086	MOTHOCC		KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?	-	-	X
BACK0087	B011A01	HE003220	KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?	-	-	X
BACK0088	FATHOCC		KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?	-	-	X
BACK0089	B012A02	BO001994	KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?	-	-	X
SUBJ0047	M810901	TM810901	ARE YOU TAKING MATH CLASSES THIS YEAR	-	-	X
SUBJ0048	M811801	JL001014	WHAT GRADE DID YOU TAKE 1ST YR ALGEBRA?	-	-	X
SUBJ0049	M811001	TM811001	HOW LONG HAVE YOU TAKEN GENERAL MATH (9-12)	-	-	X
SUBJ0050	M811002	TM811002	HOW LONG HAVE YOU TAKEN BUSINESS OR CONSUMER MATH	-	-	X
SUBJ0051	M811014	HE002487	HOW LONG TAKEN APPLIED MATH?	-	-	X
SUBJ0052	M811003	TM811003	HOW LONG HAVE YOU TAKEN INTRO (PRE) - ALGEBRA	-	-	X
SUBJ0053	M811004	TM811004	HOW LONG HAVE YOU STUDIED FIRST-YEAR ALGEBRA	-	-	X

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SUBJ0054	M811005	TM811005	HOW LONG HAVE YOU TAKEN GEOMETRY	-	-	X
SUBJ0055	M811006	TM811006	HOW LONG HAVE YOU TAKEN SECOND-YEAR ALGEBRA	-	-	X
SUBJ0056	M811007	TM811007	HOW LONG HAVE YOU TAKEN TRIGONOMETRY	-	-	X
SUBJ0057	M811008	TM811008	HOW LONG HAVE YOU TAKEN PRE-CALC (3RD YR ALGEBRA)	-	-	X
SUBJ0058	M811012	LC000030	HOW LONG TAKEN UNIFIED/INTEGRTD/SEQ MATH?	-	-	X
SUBJ0059	M811009	TM811009	HOW LONG HAVE YOU TAKEN PROBABILITY OR STATISTICS	-	-	X
SUBJ0060	M811011	TM811011	HOW LONG HAVE YOU TAKEN CALCULUS	-	-	X
SUBJ0061	M812801	WP000071	IN/HAVE TAKEN MATH ADVANCED PLACEMENT CLASS?	-	-	X
SCHL0003	C030901	HE000839	BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?	X	-	-
SCHL0004	C037101	HE000840	4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT LEVEL?	X	-	-
SCHL0005	C031212	HE002000	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?	X	-	-
SCHL0006	C031205	HE002002	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?	X	-	-
SCHL0007	C031213	LD001554	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?	X	-	-
SCHL0008	C031214	LD001555	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?	X	-	-
SCHL0009	C031603	HE000861	HAS MATH BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0010	C031607	LC000469	HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0011	C031601	HE000859	HAS READING BEEN IDENTIFIED AS A PRIORITY?	X	-	-
SCHL0012	C031610	LD001556	HAS ARTS BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0013	C031606	HE000958	HAS SUBJECT INTEGRATION BEEN A PRIORITY?	X	X	-
SCHL0014	C035701	HE000843	COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?	X	X	X
SCHL0015	C035702	HE000864	COMPUTERS GROUPED IN SEPARATE LAB AND AVAILABLE?	X	X	X
SCHL0016	C035703	HE000866	COMPUTERS AVAILABLE TO BRING TO ROOM WHEN NEEDED?	X	X	X
SCHL0017	C037201	HE002006	SCHOOL W/ SPECIAL FOCUS ON MATH?	X	X	X
SCHL0018	C037202	HE002008	SCHOOL W/ SPECIAL FOCUS ON SCIENCE?	X	X	X
SCHL0019	C037207	LD001557	SCHOOL W/ SPECIAL FOCUS ON MATH?	X	-	-
SCHL0020	C037204	LD001558	SCHOOL W/ SPECIAL FOCUS ON ARTS?	X	X	X
SCHL0021	C037205	HE002011	SCHOOL W/ SPECIAL FOCUS ON OTHER?	X	X	X
SCHL0022	C037206	HE002012	SCHOOL NOT A SPECIAL FOCUS SCHOOL?	X	X	X
SCHL0023	C037301	HE002014	SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?	X	X	X
SCHL0024	C037302	HE002016	SCHOOL FOLLOW DISTRICT/STATE SCIENCE CURRICULUM?	X	X	X
SCHL0025	C037303	LD001559	SCHOOL FOLLOW DISTRICT/STATE READING CURRICULUM?	X	-	-
SCHL0026	C037304	LD001560	SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?	X	X	X
SCHL0027	C037305	HE002019	SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?	X	X	X
SCHL0028	C037401	HE002021	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?	X	-	-
SCHL0029	C037402	HE002023	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?	X	-	-
SCHL0030	C037403	LD001561	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?	X	-	-
SCHL0031	C037404	LD001562	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?	X	-	-
SCHL0032	C037405	HE002026	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?	X	-	-
SCHL0033	C037406	HE002027	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE ABOVE?	X	-	-
SCHL0034	C037501	HE002029	4TH GRADERS IN EXTRACURR ACTS FOR MATH?	X	-	-
SCHL0035	C037502	HE002031	4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	X	-	-
SCHL0036	C037503	LD001563	4TH GRADERS IN EXTRACURR ACTS FOR READING?	X	-	-
SCHL0037	C037504	LD001564	4TH GRADERS IN EXTRACURR ACTS FOR ARTS?	X	-	-
SCHL0038	C037505	HE002034	4TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?	X	-	-
SCHL0039	C037601	HE002036	4TH GRADERS IN SUMMER PROGRAMS IN MATH?	X	-	-
SCHL0040	C037602	HE002038	4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	X	-	-
SCHL0041	C037603	LD001565	4TH GRADERS IN SUMMER PROGRAMS IN READING?	X	-	-
SCHL0042	C037604	LD001566	4TH GRADERS IN SUMMER PROGRAMS IN ARTS?	X	-	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0043	C037605	HE002041	4TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	X	-	-
SCHL0044	C036601	LC000502	WHICH BEST DESCRIBES PRIMARY WAY LIBRARY STAFFED?	X	X	X
SCHL0045	C032207	HE000875	INVOLVE PARENTS AS AIDES IN CLASSROOM?	X	X	X
SCHL0046	C032209	LC000482	HAVE PARENTS REVIEW/SIGN HOMEWORK?	X	X	X
SCHL0047	C032210	LC000484	ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?	X	X	X
SCHL0048	C032211	LC000486	HAVE A PARENT VOLUNTEER PROGRAM?	X	X	X
SCHL0049	C037701	HE002142	WHAT % OF PARENTS IN PARENT-TEACHER ORGS?	X	X	X
SCHL0050	C037702	HE002108	WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL NIGHT?	X	X	X
SCHL0051	C037703	HE002109	WHAT % OF PARENTS IN PARENT-TEACHER CONFERENCES?	X	X	X
SCHL0052	C037704	HE002110	WHAT % PARENTS INVOLVED MAKING CURRICULUM DECISION	X	X	X
SCHL0053	C037705	HE002111	WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?	X	X	X
SCHL0054	C032402	HE000888	IS STUDENT ABSENTEEISM A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0055	C032401	HE000887	IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0056	C032404	HE000890	ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0057	C032406	HE000892	IS TEACHER ABSENTEEISM A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0058	C032407	HE000893	ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0059	C032408	HE000894	IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0060	C032409	HE002121	IS LACK OF PARENT INVLMT A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0061	C032410	HE002122	IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0062	C032411	HE002123	IS STUDENT TOBACCO USE A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0063	C032412	HE002124	IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0064	C032413	HE002125	ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0065	C032414	HE002126	IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0066	C032415	HE002127	IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0067	C032502	HE000897	IS TEACHER MORALE POS. OR NEG.?	X	X	X
SCHL0068	C032503	HE000898	ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?	X	X	X
SCHL0069	C032505	HE000900	IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?	X	X	X
SCHL0070	C032506	HE000901	IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?	X	X	X
SCHL0071	C033601	HE000917	% ABSENT ON AVERAGE DAY?	X	X	X
SCHL0072	C036501	LC000488	WHAT % OF TEACHERS ABSENT ON GIVEN DAY?	X	X	X
SCHL0073	C037801	HE000918	% OF STUDS EROLLED AT START OF YR EROLLED AT END?	X	X	X
SCHL0074	C037901	HE002112	% OF 4TH GRADERS HELD BACK & REPEATING 4TH GRADE?	X	-	-
SCHL0075	C038001	HE000920	% OF FULL TIME TEACHERS LEFT BEFORE END OF YR?	X	X	X
SCHL0076	C038301	HE002094	IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?	X	X	X
SCHL0077	C038801	WP000069	SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?	X	X	X*
SCHL0078	C034101	HE002143	DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0079	C034102	HE002113	DID HEADMASTER/HEADMISTRESS FILL OUT QUESTIONNAIRE	X	X	X
SCHL0080	C034103	HE002114	DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0081	C034104	HE002115	DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0082	C034105	HE002116	DID COUNSELOR FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0083	C034106	HE002117	DID CURRICULUM COORD FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0084	C034107	HE002118	DID TEACHER FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0085	C034108	HE002119	DID SECRETARY FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0086	C034109	HE002120	DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE	X	X	X
TCHR0001	T055901	HE001004	WHAT IS YOUR GENDER?	X	X	-
TCHR0002	T056001	LD001610	WHICH BEST DESRIBES YOU?	X	X	-
TCHR0003	T040301	HE001007	YEARS TAUGHT	X	X	-
TCHR0004	T056101	LD001500	HOW MANY YRS TOTAL YOU TAUGHT MATH?	X	-	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TCHR0005	T056102	LD001501	HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?	X	-	-
TCHR0006	T056201	HE002551	TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?	X	X	-
TCHR0007	T040501	HE001010	CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS ED?	X	X	-
TCHR0008	T040506	HE002552	DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?	X	X	-
TCHR0009	T040504	HE001082	DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?	X	X	-
TCHR0010	T040507	HE002553	CERTIFICATION, ELEMENTARY SCIENCE?	X	-	-
TCHR0011	T040508	HE002554	CERTIFICATION, MIDDLE/JUNIOR SCIENCE	X	-	-
TCHR0012	T040505	HE002555	CERTIFICATION, OTHER	X	X	-
TCHR0013	T056301	HE001012	HIGHEST ACADEMIC DEGREE YOU HOLD?	X	X	-
TCHR0014	T040701	HE002556	EDUCATION UNDERGRAD MAJOR	X	X	-
TCHR0015	T040706	HE002557	ELMENT ED UNDERGRAD MAJOR	X	X	-
TCHR0016	T040707	HE002558	SEC ED UNDERGRAD MAJOR	X	X	-
TCHR0017	T040703	HE002559	WAS YOUR UNDERGRADUATE MAJOR MATH?	X	X	-
TCHR0018	T040704	HE002560	WAS YOUR UNDERGRADUATE MAJOR MATH ED?	X	X	-
TCHR0019	T040710	HE002561	SCIENCE ED UNDERGRAD MAJOR	X	X	-
TCHR0020	T040711	HE002562	LIFE SCIENCE UNDERGRAD MAJOR?	X	-	-
TCHR0021	T040712	HE002563	PHYSICAL SCIENCE UNDERGRAD MAJOR?	X	-	-
TCHR0022	T040713	HE002564	EARTH SCIENCE UNDERGRAD MAJOR?	X	-	-
TCHR0023	T040708	HE002565	SPECIAL EDUCATION UNDERGRAD MAJOR	X	X	-
TCHR0024	T040709	HE002566	BILINGUAL ED/ESL UNDERGRAD MAJOR	X	X	-
TCHR0025	T040705	HE002567	OTHER UNDERGRAD MAJOR	X	X	-
TCHR0026	T040801	HE002568	EDUCATION GRAD MAJOR	X	X	-
TCHR0027	T040807	HE002569	ELEMENTARY ED GRAD MAJOR	X	X	-
TCHR0028	T040808	HE002570	SECONDARY ED GRAD MAJOR	X	X	-
TCHR0029	T040803	HE002571	WAS YOUR GRADUATE MAJOR MATHEMATICS?	X	X	-
TCHR0030	T040804	HE002572	WAS YOUR GRADUATE MAJOR MATH ED?	X	X	-
TCHR0031	T040814	HE002573	SCIENCE ED GRAD MAJOR?	X	-	-
TCHR0032	T040815	HE002574	LIFE SCIENCE GRAD MAJOR?	X	-	-
TCHR0033	T040816	HE002575	PHYSICAL SCIENCE GRAD MAJOR?	X	-	-
TCHR0034	T040817	HE002576	EARTH SCIENCE GRAD MAJOR?	X	-	-
TCHR0035	T040809	HE002577	SPECIAL ED GRAD MAJOR	X	X	-
TCHR0036	T040810	HE002578	BILINGUAL GRAD MAJOR	X	X	-
TCHR0037	T040811	HE002579	ADMIN/SUPERVISION GRAD MAJOR	X	X	-
TCHR0038	T040812	HE002580	CURRICULUM/INSTRUCTION GRAD MAJOR?	X	X	-
TCHR0039	T040813	LD001506	COUNSELING GRAD MAJOR?	X	X	-
TCHR0040	T040805	HE002581	OTHER GRAD MAJOR	X	X	-
TCHR0041	T040806	HE002582	NO GRADUATE STUDY	X	X	-
TCHR0042	T056401	HE002584	UNDERGRAD/GRAD MINOR STUDY-EDUCATION	X	X	-
TCHR0043	T056402	HE002585	UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED	X	X	-
TCHR0044	T056403	HE002586	UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED	X	X	-
TCHR0045	T056404	HE002587	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS	X	X	-
TCHR0046	T056405	HE002588	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED	X	X	-
TCHR0047	T056413	HE002589	UNDERGRAD/GRAD MINOR STUDY-SCIENCE ED	X	-	-
TCHR0048	T056414	HE002590	UNDERGRAD/GRAD MINOR STUDY-LIFE SCIENCE	X	-	-
TCHR0049	T056415	HE002591	UNDERGRAD/GRAD MINOR STUDY-PHYSICAL SCIENCE	X	-	-
TCHR0050	T056416	HE002592	UNDERGRAD/GRAD MINOR STUDY-EARTH SCIENCE	X	-	-
TCHR0051	T056406	HE002593	UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED	X	X	-
TCHR0052	T056407	HE002594	UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED	X	X	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TCHR0053	T056408	HE002595	UNDERGRAD/GRAD MINOR STUDY-ADMIN & SUPERVISION	X	X	-
TCHR0054	T056409	HE002596	UNDERGRAD/GRAD MINOR STUDY-CURRICULUM & INSTRUC	X	X	-
TCHR0055	T056410	LD001509	UNDERGRAD/GRAD MINOR STUDY-COUNSELING	X	X	-
TCHR0056	T056411	HE002597	UNDERGRAD/GRAD MINOR STUDY-OTHER	X	X	-
TCHR0057	T056412	HE002598	UNDERGRAD/GRAD MINOR STUDY-NONE	X	X	-
TCHR0058	T056501	HE002599	LAST YR, HOW MUCH TIME IN MATH/MATH ED SEM/WRKSHP?	X	X	-
TCHR0059	T058101	he002600	LAST YR, HOW MUCH TIME IN SCI/SCI ED SEM/WRKSHPS?	X	-	-
TCHR0060	T056601	HE002601	LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?	X	X	-
TCHR0061	T058201	HE002602	LAST 2 YRS, HOW MANY SCI/SCI ED UNIV COURSES?	X	-	-
TCHR0062	T056701	HE002604	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM USE	X	X	-
TCHR0063	T056702	HE002605	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE	X	X	-
TCHR0064	T056703	HE002606	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP INSTRCT	X	X	-
TCHR0065	T056704	HE002607	PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT	X	X	-
TCHR0066	T056705	HE002608	PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT	X	X	-
TCHR0067	T056706	HE002609	PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED ASSMNT	X	X	-
TCHR0068	T056707	HE002610	PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER THKG	X	X	-
TCHR0069	T056708	HE002611	PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT BKGD	X	X	-
TCHR0070	T056709	HE002612	PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS	X	X	-
TCHR0071	T056710	HE002613	PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED STDS	X	X	-
TCHR0072	T056711	HE002614	PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG	X	X	-
TCHR0073	T056712	HE002615	PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES	X	X	-
TCHR0074	T056713	HE002616	PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE	X	X	-
TCHR0075	T041201	HE001022	AVAILABILITY OF RESOURCES	X	X	-
TCHR0076	T041302	LD001512	ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?	X	-	-
TCHR0077	T041303	LD001513	SCIENCE CURRICULUM SPECIALIST	X	-	-
TCHR0078	T056801	HE001251	HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?	X	X	-
TCHR0079	T056901	HE003110	METHODS OF TEACHING ELEM MATH- 1+COLLEGE COURSE	X	X	-
TCHR0080	T0569A1	HE003110	METHODS OF TEACHING ELEM MATH-PART COLLEGE COURSE	X	X	-
TCHR0081	T0569B1	HE003110	METHODS OF TEACHING ELEM MATH-SEMINAR	X	X	-
TCHR0082	T0569C1	HE003110	METHODS OF TEACHING ELEM MATH-LITTLE NO EXPOSURE	X	X	-
TCHR0083	T056902	HE003111	NUMBER SYSTEMS & NUMERATION-1+ COLLEGE COURSE	X	X	-
TCHR0084	T0569A2	HE003111	NUMBER SYSTEMS & NUMERATION-PART COLLEGE COURSE	X	X	-
TCHR0085	T0569B2	HE003111	NUMBER SYSTEMS & NUMERATION-SEMINAR	X	X	-
TCHR0086	T0569C2	HE003111	NUMBER SYSTEMS & NUMERATION-LITTLE/NO EXPOSURE	X	X	-
TCHR0087	T056903	HE003112	MEASUREMENT IN MATH- 1+COLLEGE COURSE	X	X	-
TCHR0088	T0569A3	HE003112	MEASUREMENT IN MATH- PART COLLEGE COURSE	X	X	-
TCHR0089	T0569B3	HE003112	MEASUREMENT IN MATH- -SEMINAR	X	X	-
TCHR0090	T0569C3	HE003112	MEASUREMENT IN MATH- -LITTLE NO EXPOSURE	X	X	-
TCHR0091	T056904	HE003113	GEOMETRY- 1+COLLEGE COURSE	X	X	-
TCHR0092	T0569A4	HE003113	GEOMETRY-PART COLLEGE COURSE	X	X	-
TCHR0093	T0569B4	HE003113	GEOMETRY-SEMINAR	X	X	-
TCHR0094	T0569C4	HE003113	GEOMETRY-LITTLE NO EXPOSURE	X	X	-
TCHR0095	T056905	HE003114	PROBABILITY/STATISTICS- 1+COLLEGE COURSE	X	X	-
TCHR0096	T0569A5	HE003114	PROBABILITY/STATISTICS-PART COLLEGE COURSE	X	X	-
TCHR0097	T0569B5	HE003114	PROBABILITY/STATISTICS-SEMINAR	X	X	-
TCHR0098	T0569C5	HE003114	PROBABILITY/STATISTICS-LITTLE NO EXPOSURE	X	X	-
TCHR0099	T056906	WO001011	COLLEGE ALGEBRA- 1+COLLEGE COURSE	X	X	-
TCHR0100	T0569A6	WO001011	COLLEGE ALGEBRA-PART COLLEGE COURSE	X	X	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TCHR0101	T0569B6	WO001011	COLLEGE ALGEBRA-SEMINAR	X	X	-
TCHR0102	T0569C6	WO001011	COLLEGE ALGEBRA-LITTLE NO EXPOSURE	X	X	-
TCHR0103	T056907	HE003116	CALCULUS- 1+COLLEGE COURSE	X	X	-
TCHR0104	T0569A7	HE003116	CALCULUS-PART COLLEGE COURSE	X	X	-
TCHR0105	T0569B7	HE003116	CALCULUS-SEMINAR	X	X	-
TCHR0106	T0569C7	HE003116	CALCULUS-LITTLE NO EXPOSURE	X	X	-
TCHR0107	T056908	HE003117	ABSTRACT/LINEAR ALGEBRA- 1+COLLEGE COURSE	X	X	-
TCHR0108	T0569A8	HE003117	ABSTRACT/LINEAR ALGEBRA-PART COLLEGE COURSE	X	X	-
TCHR0109	T0569B8	HE003117	ABSTRACT/LINEAR ALGEBRA-SEMINAR	X	X	-
TCHR0110	T0569C8	HE003117	ABSTRACT/LINEAR ALGEBRA-LITTLE NO EXPOSURE	X	X	-
TCHR0111	T057001	HE003118	EVER STUDIED ESTIMATION?	X	X	-
TCHR0112	T057002	HE003119	EVER STUDIED PROBLEM SOLVING IN MATH?	X	X	-
TCHR0113	T057003	HE003120	EVER STUDIED USE OF MANIPULATIVES?	X	X	-
TCHR0114	T057004	HE003121	EVER STUDIED USE OF CALCULATORS IN MATH INSTRC?	X	X	-
TCHR0115	T057005	HE003122	EVER STUDIED UNDERSTANDING STUDS MATH THINKING?	X	X	-
TCHR0116	T057006	HE003123	EVER STUDIED GENDER ISSUES IN TEACHING MATH?	X	X	-
TCHR0117	T057007	HE003124	EVER STUDIED TEACHING STUDS OF DIFF CULTURES?	X	X	-
TCHR0118	T057101	WO001012	KNOWLEDGE OF NCTM CURR & EVAL STANDARDS FOR MATH?	X	X	-
TCHR0119	T057201	WO001013	PRO ACTVTS-STRATEGIES LOCAL WORKSHOPS	X	X	-
TCHR0120	T057211	WO001013	PRO ACTVTS-STRATEGIES REGIONAL NCTM MEETING	X	X	-
TCHR0121	T057221	WO001013	PRO ACTVTS-STRATEGIES NATIONAL NCTM MEETING	X	X	-
TCHR0122	T057231	WO001013	PRO ACTVTS-STRATEGIES OTHER	X	X	-
TCHR0123	T057241	WO001013	PRO ACTVTS-STRATEGIES NO	X	X	-
TSUB0001	T057301	HE002379	IMPORTANCE W/ STUDS-APPLYING MATH IDEAS?	X	X	-
TSUB0002	T057302	HE002380	IMPORTANCE W/ STUDS-PROB SOLVING=GOAL & CONCEPT?	X	X	-
TSUB0003	T057303	HE002381	IMPORTANCE W/ STUDS-? TECHS PROMOTE STUD TALK?	X	X	-
TSUB0004	T057304	HE002382	IMPORTANCE W/ STUDS-USE RESULTS TO INFORM DECISION	X	X	-
TSUB0005	T057401	HE001131	TO ACCESS PROGRESS HOW OFTEN USE MULT CHOICE TESTS	X	X	-
TSUB0006	T057402	HE001132	TO ACCESS PROGRESS HOW OFTEN USE PROBLEM SETS	X	X	-
TSUB0007	T057403	HE001133	TO ACCESS PROGRESS HOW OFTEN USE SHORT WRITTEN RSP	X	X	-
TSUB0008	T057404	HE001134	TO ACCESS PROGRESS HOW OFTEN USE INDV/GROUP PRJCTS	X	X	-
TSUB0009	T057405	HE002396	TO ACCESS PROGRESS HOW OFTEN USE PORTFOLIOS	X	X	-
TSUB0010	T057501	HE002401	BEST DESCRIPTION OF COMPUTER AVAILABLITY IN MATH	X	X	-
TSUB0011	T057601	HE002402	PRIMARY USE OF COMPUTERS FOR MATH INSTRUCTION?	X	X	-
TSUB0012	T044002	HE002412	ARE STUDENTS ASSIGNED TO THIS CLASS BY ABILITY?	X	X	-
TSUB0013	T057701	HE002383	IF ASSIGNED BY ABILITY, WHAT BASIS ASSIGNED?	X	X	-
TSUB0014	T057801	HE002384	IF ASSIGNED BY ABILITY, WHAT IS MATH ABILITY?	X	X	-
TSUB0015	T044201	HE001104	CREATE GROUPS IN CLASS FOR MATH ON ABILITY BASIS?	X	X	-
TSUB0016	T044301	HE001105	TIME/WEEK ON MATH INSTRUTION?	X	X	-
TSUB0017	T057901	HE002385	HOW MUCH TIME PER WEEK STUDS DO MATH W/ PARTNER?	X	X	-
TSUB0018	T044401	HE001106	AMOUNT MATH HOMEWORK ASSIGN/DAY?	X	X	-
TSUB0019	T044501	HE001108	HOW OFTEN DO STUDENTS DO MATH FROM TEXTBOOKS?	X	X	-
TSUB0020	T044502	HE001109	HOW OFTEN DO STUDENTS DO MATH ON WORKSHEETS?	X	X	-
TSUB0021	T044512	HE001110	HOW OFTEN DO STUDENTS SOLVE PROBS W/ OTHER STUDS?	X	X	-
TSUB0022	T044513	HE002397	HOW OFTEN DO STUDENTS WORK W/ OBJECTS LIKE RULERS?	X	X	-
TSUB0023	T044514	HE002398	HOW OFTEN WORK W/ COUNTING BLOCKS.GEOMETRIC SHAPES	X	X	-
TSUB0024	T044505	HE001112	HOW OFTEN DO STUDENTS USE A CALCULATOR?	X	X	-
TSUB0025	T044515	HE002399	HOW OFTEN DO STUDENTS TAKE MATH TESTS?	X	X	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TSUB0026	T044507	HE001114	HOW OFTEN DO STUDENTS WRITE ABOUT PROBLEM-SOLVING?	X	X	-
TSUB0027	T044516	HE002400	HOW OFTEN DO STUDENTS TALK ABOUT MATH WORK?	X	X	-
TSUB0028	T044508	HE001115	HOW OFTEN DO STUDENTS WRITE REPORTS/DO PROJECTS?	X	X	-
TSUB0029	T044509	HE001116	HOW OFTEN DO STUDENTS DISCUSS MATH W/OTHER STDNTS?	X	X	-
TSUB0030	T044510	HE001117	HOW OFTEN DO STUDENTS WORK REAL-LIFE MATH PRBLMS?	X	X	-
TSUB0031	T044506	HE001113	HOW OFTEN DO STUDENTS USE A COMPUTER?	X	X	-
TSUB0032	T058001	HE002387	IN MATH CLASS HOW OFTEN ADDRESS-NUMBERS & OPS?	X	X	-
TSUB0033	T058002	HE002388	IN MATH CLASS HOW OFTEN ADDRESS-MEASUREMENT?	X	X	-
TSUB0034	T058003	HE002389	IN MATH CLASS HOW OFTEN ADDRESS-GEOMETRY?	X	X	-
TSUB0035	T058004	HE002390	IN MATH CLASS HOW OFTEN ADDRESS-DATA ANALYSIS?	X	X	-
TSUB0036	T058005	HE002391	IN MATH CLASS HOW OFTEN ADDRESS-ALGEBRA & FUNCT?	X	X	-
TSUB0037	T058006	HE002392	IN MATH HOW OFTEN ADDRESS-LRN MATH FACTS/CONCEPTS?	X	X	-
TSUB0038	T058007	HE002393	IN MATH HOW OFTEN ADDRESS-LRN SKILLS/PROCEDURES?	X	X	-
TSUB0039	T058008	HE002394	IN MATH HOW OFTEN ADDRESS-DEVELOP REASONING ABLTY?	X	X	-
TSUB0040	T058009	HE002395	IN MATH HOW OFTEN ADDRESS-LRN TO COMMUNICATE MATH?	X	X	-
TSUB0041	T045401	HE001135	DO YOU PERMIT UNRESTRICTED USE OF CALCULATORS?	X	X	-
TSUB0042	T044801	HE001136	DO YOU PERMIT USE OF CALCULATORS ON TESTS?	X	X	-
TSUB0043	T045001	HE001183	STUDENTS HAVE ACCESS TO SCHL-OWNED CALCULATORS?	X	X	-
TSUB0044	T044901	HE001279	DO YOU PROVIDE INSTRUCTION IN USE OF CALCULATORS?	X	X	-
TSUB0045	T045304	HE001276	HOW PREPARED TO TEACH MATH CONCEPTS?	X	X	-
TSUB0046	T045305	HE002403	HOW PREPARED TO TEACH MATH PROCEDURES?	X	X	-
TSUB0047	T045302	HE001145	HOW PREPARED TO TEACH USE OF COMPUTERS?	X	X	-
TSUB0048	T045303	HE001146	HOW PREPARED TO TEACH USE OF CALCULATORS?	X	X	-
TSUB0049	T044000	WP000051	NUMBER OF STUDENTS IN CLASS?	X	X	-
SCHL0087	C034201	HE000926	BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?	-	X	-
SCHL0088	C034402	HE002232	ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?	-	X	-
SCHL0089	C034403	HE002234	ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?	-	X	-
SCHL0090	C034401	LD001571	ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?	-	X	-
SCHL0091	C034406	LD001572	ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?	-	X	-
SCHL0092	C034510	HE002146	HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?	-	X	-
SCHL0093	C034511	HE002148	HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?	-	X	-
SCHL0094	C034512	HE002149	HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?	-	X	-
SCHL0095	C034513	LD001573	HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?	-	X	-
SCHL0096	C034514	LD001574	HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?	-	X	-
SCHL0097	C031611	LD001575	HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?	-	X	-
SCHL0098	C034601	HE000935	SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?	-	X	-
SCHL0099	C037203	LD001557	SCHOOL W/ SPECIAL FOCUS ON ENGLISH?	-	X	X
SCHL0100	C037306	LD001577	SCHOOL FOLLOW DISTRICT/STATE ENGLISH CURRICULUM?	-	X	X
SCHL0101	C039401	HE002155	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?	-	X	-
SCHL0102	C039402	HE002157	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?	-	X	-
SCHL0103	C039403	LD001578	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?	-	X	-
SCHL0104	C039404	LD001579	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?	-	X	-
SCHL0105	C039405	HE002160	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?	-	X	-
SCHL0106	C039406	HE002161	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE ABOVE?	-	X	-
SCHL0107	C039501	HE002164	8TH GRADERS IN EXTRACURR ACTS FOR MATH?	-	X	-
SCHL0108	C039502	HE002166	8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	-	X	-
SCHL0109	C039503	LD001580	8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG ARTS?	-	X	-
SCHL0110	C039504	LD001581	8TH GRADERS IN EXTRACURR ACTS FOR ARTS?	-	X	-

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0111	C039505	HE002169	8TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?	-	X	-
SCHL0112	C039601	HE002172	8TH GRADERS IN SUMMER PROGRAMS IN MATH?	-	X	-
SCHL0113	C039602	HE002174	8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	-	X	-
SCHL0114	C039603	LD001582	8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG ARTS?	-	X	-
SCHL0115	C039604	LD001583	8TH GRADERS IN SUMMER PROGRAMS IN ARTS?	-	X	-
SCHL0116	C039605	HE002177	8TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	-	X	-
SCHL0117	C041901	HE002230	WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?	-	X	-
TCHR0124	T063001	HE001081	YRS TOTAL TAUGHT MATH	-	X	-
TCHR0125	T058301	HE002617	CURRICULUM SPECIALIST TO HELP/ADVISE IN MATH?	-	X	-
SCHL0118	C035002	HE002247	ARE 12TH-GRADERS ASSIGNED TO MATH BY ABILITY?	-	-	X
SCHL0119	C035003	HE002249	ARE 12TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?	-	-	X
SCHL0120	C035006	LD001588	ARE 12TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?	-	-	X
SCHL0121	C035007	LD001589	ARE 12TH-GRADERS ASSIGNED TO ARTS BY ABILITY?	-	-	X
SCHL0122	C040201	HE002253	FROM 9TH ON HOW MANY YRS REQUIRED FOR MATH?	-	-	X
SCHL0123	C040202	HE002254	FROM 9TH ON HOW MANY YRS REQUIRED FOR SCIENCE?	-	-	X
SCHL0124	C040203	LD001590	FROM 9TH ON HOW MANY YRS REQUIRED FOR ENG/LIT?	-	-	X
SCHL0125	C040204	HE002255	FROM 9TH ON HOW MANY YRS REQUIRED FINE/PERF ARTS?	-	-	X
SCHL0126	C040301	HE002256	COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED BIO?	-	-	X
SCHL0127	C040302	HE002257	COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED CHEM?	-	-	X
SCHL0128	C040303	HE002258	COURSES 1 OR > SEMESTERS TAUGHT IN ADV PHYSICS?	-	-	X
SCHL0129	C040304	HE002259	NO ADVANCED SCIENCE COURSES TAUGHT	-	-	X
SCHL0130	C040305	WP000094	COURSES 1 OR > SEMESTERS TAUGHT IN COMP SCI?	-	-	X
SCHL0131	C040306	LC000512	COURSES 1 OR > SEMESTERS TAUGHT IN CALCULUS?	-	-	X
SCHL0132	C040307	WP000095	COURSES 1 OR > SEMESTERS TAUGHT IN TRIGONOMETRY?	-	-	X
SCHL0133	C040308	WP000096	COURSES 1 OR > SEMESTERS TAUGHT IN PRECALCULUS?	-	-	X
SCHL0134	C040309	LC000511	COURSES 1 OR > SEMESTERS TAUGHT IN PROB/STAT?	-	-	X
SCHL0135	C040310	WP000098	COURSES 1 OR > SEMESTERS TAUGHT IN UNI/INTEG MATH?	-	-	X
SCHL0136	C040311	HE002260	NO ADVANCED MATH COURSES TAUGHT?	-	-	X
SCHL0137	C040401	HE002272	STUDS REQUIRED TO PASS STATE TEST IN MATH?	-	-	X
SCHL0138	C040402	HE002273	STUDS REQUIRED TO PASS STATE TEST IN SCIENCE?	-	-	X
SCHL0139	C040403	LD001591	STUDS REQUIRED TO PASS STATE TEST IN ENG/LANG ARTS	-	-	X
SCHL0140	C040404	HE002274	STUDS REQUIRED TO PASS STATE TEST IN FINE/PERF ART	-	-	X
SCHL0141	C040501	HE002277	SCHOOL SPONSER 12TH GR FIELD TRIPS FOR MATH?	-	-	X
SCHL0142	C040502	HE002279	SCHOOL SPONSER 12TH GR FIELD TRIPS FOR SCIENCE?	-	-	X
SCHL0143	C040503	LD001592	SCHOOL SPONSER 12TH GR FIELD TRIPS IN ENG/LANG ART	-	-	X
SCHL0144	C040504	LD001593	SCHOOL SPONSER 12TH GR FIELD TRIPS IN ARTS?	-	-	X
SCHL0145	C040505	HE002286	SCHOOL SPONSER 12TH GR FIELD TRIPS IN OTHER?	-	-	X
SCHL0146	C040506	HE002288	SCHOOL SPONSER 12TH GR FIELD TRIPS IN NONE ABOVE?	-	-	X
SCHL0147	C040601	HE002296	12TH GRADERS IN EXTRACURR ACTS IN MATH?	-	-	X
SCHL0148	C040602	HE002288	12TH GRADERS IN EXTRACURR ACTS IN SCIENCE?	-	-	X
SCHL0149	C040603	LD001594	12TH GRADERS IN EXTRACURR ACTS IN ENG/LANG ARTS?	-	-	X
SCHL0150	C040604	LD001595	12TH GRADERS IN EXTRACURR ACTS IN ARTS?	-	-	X
SCHL0151	C040605	HE002291	12TH GRADERS IN EXTRACURR ACTS IN NONE OF ABOVE?	-	-	X
SCHL0152	C040701	HE002294	12TH GRADERS IN SUMMER PROGRAMS IN MATH?	-	-	X
SCHL0153	C040702	HE002296	12TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	-	-	X
SCHL0154	C040703	LD001596	12TH GRADERS IN SUMMER PORGRAMS IN ENG/LANG ARTS?	-	-	X
SCHL0155	C040704	LD001597	12TH GRADERS IN SUMMER PROGRAMS IN ARTS?	-	-	X
SCHL0156	C040705	HE002299	12TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	-	-	X

Table C-2 (continued)

Summary Table of the 1996 Mathematics Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0157	C040801	HE002346	# STUDS ENROLLED IN AP SCIENCE COURSES?	-	-	X
SCHL0158	C040802	HE002347	# STUDS ENROLLED IN AP CALCULUS COURSES?	-	-	X
SCHL0159	C040803	HE002350	# STUDS ENROLLED IN AP COMP SCI COURSES?	-	-	X
SCHL0160	C040804	LD001598	# STUDS ENROLLED IN AP ENGLISH COURSES?	-	-	X
SCHL0161	C040901	HE002353	ANY 12TH GRDS TAKING COLLEGE COURSES IN MATH?	-	-	X
SCHL0162	C040902	HE002355	ANY 12TH GRDS TAKING COLLEGE COURSES IN SCIENCE?	-	-	X
SCHL0163	C040903	LD001599	ANY 12TH GRDS TAKING COLLEGE COURSES ENG/LANG ARTS	-	-	X
SCHL0164	C040904	LD001600	ANY 12TH GRDS TAKING COLLEGE COURSES IN ARTS?	-	-	X
SCHL0165	C040905	HE002358	ANY 12TH GRDS TAKING COLLEGE COURSES IN NONE ABOVE	-	-	X
SCHL0166	C041001	HE002359	WHAT % 12TH GRDS HELD BACK AND REPEAT 12TH GRADE?	-	-	X
SCHL0167	C041101	HE003193	LAST YR WHAT % OF 12TH GRDS GRADUATED?	-	-	X
SCHL0168	C036001	HE001002	WHAT % OF GRADUATING CLASS NOW IN 2-YR COLLEGE?	-	-	X
SCHL0169	C036002	HE001003	WHAT % OF GRADUATING CLASS NOW IN 4-YR COLLEGE?	-	-	X
SCHL0170	C036003	HE002360	WHAT % OF GRADUATING CLASS NOW IN VO-TEC SCHOOL?	-	-	X
SCHL0171	C036004	HE002361	WHAT % OF GRAD CLASS NOW IN EMPLOYER TRAINING?	-	-	X
SCHL0172	C036005	HE002362	% OF GRADUATING CLASS NOW IN MILITARY SERVICE?	-	-	X
SCHL0173	NTLUNSC		PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	X	X
SCHL0174	NTLUNSC		PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	X	X
SCHL0175	REMRDSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING	X	X	X
SCHL0176	REMRDSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING	X	X	X
SCHL0177	REMMHSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH	X	X	X
SCHL0178	REMMHSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH	X	X	X
SCHL0179	NTLUNGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	-	-
SCHL0180	NTLUNGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	-	-
SCHL0181	REMRDGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING	X	-	-
SCHL0182	REMRDGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING	X	-	-
SCHL0183	REMMHGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH	X	-	-
SCHL0184	REMMHGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH	X	-	-
SCHL0185	NTLUNGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	X	-
SCHL0186	NTLUNGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	X	-
SCHL0187	REMRDGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING	-	X	-
SCHL0188	REMRDGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING	-	X	-
SCHL0189	REMMHGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH	-	X	-
SCHL0190	REMMHGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH	-	X	-
SCHL0191	NTLUNGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	-	X
SCHL0192	NTLUNGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	-	X
SCHL0193	REMRDGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING	-	-	X
SCHL0194	REMRDGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING	-	-	X
SCHL0195	REMMHGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH	-	-	X
SCHL0196	REMMHGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH	-	-	X
BACK0091	BOOK		BOOK NUMBER FOR SCREENING	X	X	X

Table C-3

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
BACK0001	BKSER		GRAND MEAN	X	X	X
BACK0002	DSEX		DERIVED SEX	X	X	X
BACK0003	DRACE		DERIVED RACE/ETHNICITY	X	X	X
BACK0004	B003101	TB003101	IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND?	X	X	X
BACK0005	TOL8		MSA/NON-MSA	X	X	X
BACK0006	TOL5		TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0007	DOC		DESCRIPTION OF COMMUNITY	X	X	X
BACK0008	PARED		PARENTS' HIGHEST LEVEL OF EDUCATION	X	X	X
BACK0009	REGION		REGION OF THE COUNTRY	X	X	X
BACK0010	SCHTYPE		SCHOOL TYPE (PQ)	X	X	X
BACK0011	IEP		INDIVIDUALIZED EDUCATION PROGRAM	X	X	X
BACK0012	LEP		LIMITED ENGLISH PROFICIENCY	X	X	X
BACK0013	TITLE1		TITLE 1 (BOOK COVER)	X	X	X
BACK0014	SLUNCH		DO YOU RECEIVE A FREE OR REDUCED-PRICE LUNCH?	X	X	X
BACK0015	B003201	TB003201	HOW OFTEN DO THE PEOPLE IN YOUR HOME SPEAK A LANGUAGE OTHER THAN ENGLISH?	X	X	X
BACK0016	B009001	LD001715	HOW MUCH TV/VIDEO DO YOU USUALLY WATCH EACH DAY? (LINEAR)	X	X	X
BACK0017	B009001	LD001715	HOW MUCH TV/VIDEO DO YOU USUALLY WATCH EACH DAY? (QUADRATIC)	X	X	X
BACK0018	B006601	TB006601	HOMEWORK ASSIGNED?: BASED ON TIME SPENT ON HOMEWORK EACH DAY.	X	X	X
BACK0019	B006601	TB006601	HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY? (LINEAR)	X	X	X
BACK0020	B006601	TB006601	HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY (QUADRATIC)	X	X	X
BACK0021	B009101	LD001716	HOURS EXTRA READING/WK, NOT CONNECTED W/ SCHOOL?	X	X	-
BACK0022	HOMEEN3		NUMBER OF ITEMS IN THE HOME (NEWSPAPER, > 25 BOOKS, ENCYCLOPEDIA, MAGAZINES) (DERIVED)	X	X	X
BACK0023	S004001	TS004001	HOW MANY DAYS OF SCHOOL MISSED LAST MONTH?	X	X	X
BACK0024	B007602	TM810801	HOW MANY GRADES IN THIS STATE (4)	-	X	-
BACK0025	B010101	HE002545	SINCE 1ST GR, NOT PROMOTION, HOW OFTEN DIFF SCHLS?	-	X	-
BACK0026	B008001	LC000006	HOW LONG LIVED IN THE UNITED STATES?	X	X	X
BACK0027	B007601	JL001015	HOW MANY GRADES IN THIS STATE? (4TH GRADE)	X	-	-
SCHL0001	SCHNORM		SCHOOL LEVEL AVERAGE SCIENCE NORMIT (MISSING VS NON-MISSING)	X	X	X
SCHL0002	SCHNORM		SCHOOL LEVEL AVERAGE SCIENCE NORMIT	X	X	X
BACK0028	B009201	HE002537	TIMES CHANGED SCHLS SINCE 1ST GR; NOT PROMOTIONS?	X	-	-
BACK0029	B007302	HE000712	TIMES CHANGED SCHOOL SINCE FIRST GRADE	-	-	X
BACK0030	B008301	LC000168	HOW MANY GRADES IN THIS STATE (12TH GRADE)	-	-	X
BACK0031	B007401	HE000717	HOW OFTEN DO YOU DISCUSS THINGS STUDIED IN SCHOOL WITH SOMEONE AT HOME?	X	X	X
BACK0032	B009301	HE002795	HOW OFTEN USE A HOME COMPUTER FOR SCHOOLWORK?	X	X	X
BACK0033	B001101	TB001101	ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?	-	-	X
BACK0034	B001101	TB001101	ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?	-	-	X
BACK0035	B008501	HE002549	WHICH BEST DESCRIBES YOUR HIGH-SCHOOL PROGRAM?	-	-	X
BACK0036	B007101	HE000333	SEMESTERS ENGLISH/LITERATURE/WRITING (MISSING VS NON-MISSING)	-	-	X
BACK0037	B007101	HE000333	NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING (LINEAR)	-	-	X
BACK0038	B007102	HE000334	SEMESTERS MATHEMATICS (MISSING VS NON-MISSING)	-	-	X
BACK0039	B007102	HE000334	NUMBER OF SEMESTERS MATHEMATICS (LINEAR)	-	-	X
BACK0040	B007103	HE000335	SEMESTERS SCIENCE (MISSING VS NON-MISSING)	-	-	X
BACK0041	B007103	HE000335	NUMBER OF SEMESTERS SCIENCE (LINEAR)	-	-	X
BACK0042	B007104	HE000336	SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (MISSING VS NON-MISSING)	-	-	X
BACK0043	B007104	HE000336	NUMBER OF SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (LINEAR)	-	-	X
BACK0044	B007105	HE000337	SEMESTERS FOREIGN LANGUAGES (MISSING VS NON-MISSING)	-	-	X
BACK0045	B007105	HE000337	NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)	-	-	X
BACK0046	B007106	HE000338	SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (MISSING VS NON-MISSING)	-	-	X

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
BACK0047	B007106	HE000338	NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (LINEAR)	-	-	X
BACK0048	B007107	TB007100	SEMESTERS ART/MUSIC (MISSING VS NON-MISSING)	-	-	X
BACK0049	B007107	TB007100	NUMBER OF SEMESTERS ART/MUSIC (LINEAR)	-	-	X
SUBJ0001	SCITAKE		WHAT KIND OF SCI CLASS ARE YOU TAKING THIS YEAR?	-	X	-
BACK0050	INTERACT		INTERACTION: GENDER BY RACE/ETHNICITY	X	X	X
BACK0051	INTERACT		INTERACTION: GENDER BY TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0052	INTERACT		INTERACTION: GENDER BY PARENTS' EDUCATION	X	X	X
BACK0053	INTERACT		INTERACTION: GENDER BY SCHOOL TYPE	X	X	X
BACK0054	INTERACT		INTERACTION: RACE/ETHNICITY BY TYPE OF LOCALE (5 CATEGORIES)	X	X	X
BACK0055	INTERACT		INTERACTION: RACE/ETHNICITY BY PARENTS' EDUCATION	X	X	X
BACK0056	INTERACT		INTERACTION: RACE/ETHNICITY BY SCHOOL TYPE	X	X	X
BACK0057	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY PARENT'S EDUCATION	X	X	X
BACK0058	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY SCHOOL TYPE	X	X	X
BACK0059	INTERACT		INTERACTION: PARENTS' EDUCATION BY SCHOOL TYPE	X	X	X
BACK0060	INTERACT		INTERACTION: GENDER BY SCIENCE COURSES TAKING THIS YEAR	-	X	-
BACK0061	INTERACT		INTERACTION: GENDER BY NUMBER OF SEMESTERS SCIENCE	-	-	X
BACK0062	INTERACT		INTERACTION: RACE/ETHNICITY BY SCIENCE COURSES TAKING THIS YEAR	-	X	-
BACK0063	INTERACT		INTERACTION: RACE/ETHNICITY BY NUMBER OF SEMESTERS SCIENCE	-	-	X
BACK0064	INTERACT		INTERACTION: PARENTS' EDUCATION BY SCIENCE COURSES TAKING THIS YEAR	-	X	-
BACK0065	INTERACT		INTERACTION: PARENTS' EDUCATION BY NUMBER OF SEMESTERS SCIENCE	-	-	X
BACK0066	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY SCIENCE COURSES TAKING THIS YEAR	-	X	-
BACK0067	INTERACT		INTERACTION: TYPE OF LOCALE (5 CATEGORIES) BY NUMBER OF SEMESTERS SCIENCE	-	-	X
BACK0068	INTERACT		INTERACTION: SCHOOL TYPE BY SCIENCE COURSES TAKING THIS YEAR	-	X	-
BACK0069	INTERACT		INTERACTION: SCHOOL TYPE BY NUMBER OF SEMESTERS SCIENCE	-	-	X
BACK0073	SUBSAMP		SAMPLE TYPE	X	X	X
BACK0074	INTERACT		INTERACTION: SAMPLE BY RACE/ETHNICITY	X	X	X
BACK0075	B008901	HE002489	DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT HOME?	X	X	X
BACK0076	B009401	HE002541	HOW SAFE DO YOU FEEL AT SCHOOL?	X	X	X
BACK0077	B005601	TB005601	DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH YOU?	X	X	X
BACK0078	B005701	TB005701	DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU?	X	X	X
SUBJ0002	K811001	HE002997	AGREE/DISAGREE: I LIKE SCIENCE	X	X	X
SUBJ0003	K811002	HE002998	AGREE/DISAGREE: I AM GOOD AT SCIENCE	X	X	X
SUBJ0004	K811003	HE002999	AGREE/DISAGREE: LEARNING SCI MOSTLY MEMORIZATION	X	X	X
SUBJ0005	K811004	HE003000	AGREE/DISAGREE: SCI USEFUL FOR EVERYDAY PROBLEMS	X	X	X
SUBJ0006	K811005	HE003001	AGREE/DISAGREE: IF CHOICE, WOULD NOT STUDY SCIENCE	X	X	X
SUBJ0007	K811006	HE003002	AGREE/DISAGREE: ALL CAN DO WELL IN SCI IF THEY TRY	X	X	X
SUBJ0008	K811007	HE003003	AGREE/DISAGREE: SCIENCE IS BORING	X	X	X
SUBJ0009	K811008	HE003004	AGREE/DISAGREE: SCIENCE IS A HARD SUBJECT	X	X	X
SUBJ0010	K811101	HE003006	EVER DONE HANDS-ON PROJECT WITH LIVING THINGS?	X	X	-
SUBJ0011	K811102	HE003007	EVER DONE HANDS-ON PROJECT WITH ELECTRICITY?	X	X	-
SUBJ0012	K811103	HE003008	EVER DONE HANDS-ON PROJECT WITH CHEMICALS?	X	X	-
SUBJ0013	K811104	HE003009	EVER DONE HANDS-ON PROJECT WITH ROCKS OR MINERALS?	X	X	-
SUBJ0014	K811105	HE003010	DONE HANDS-ON PROJ W/ MAGNIFYING GLASS/MICROSCOPE?	X	X	-
SUBJ0015	K811106	HE003011	DONE HANDS-ON PROJ W/ THERMOMETER OR BAROMETER?	X	X	-
SUBJ0016	K811107	HE003012	EVER DONE HANDS-ON PROJECT WITH SIMPLE MACHINES?	X	X	-
SUBJ0017	K811108	HE003013	HAVE DONE HANDS-ON PROJECT WITH NONE OF THE ABOVE?	X	X	-
SUBJ0018	K811201	LC000144	HOW OFTEN DO YOU STUDY SCIENCE IN SCHOOL?	X	X	-
SUBJ0019	K811301	LC000146	HOW MUCH TIME PER WEEK DOING SCIENCE HOMEWORK?	X	-	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SUBJ0020	K811401	LC000147	DO SCI PROJECTS IN SCHOOL THAT TAKE 1 OR MORE WKS?	X	X	-
SUBJ0021	K811501	WO001032	LAST 2 YRS, BEEN IN SCI FAIR, FESTIVAL, SCI DAY?	X	X	X
SUBJ0022	K811601	HE003015	FOR SCI IN SCHOOL, HOW OFTEN DO YOU READ TEXTBOOK?	X	X	X
SUBJ0023	K811602	HE003016	FOR SCI IN SCHOOL, HOW OFTEN DO YOU READ MAGS/BKS?	X	X	X
SUBJ0024	K811603	HE003017	FOR SCI IN SCHOOL, HOW OFTEN DISCUSS SCIENCE NEWS?	X	X	X
SUBJ0025	K811604	WO001033	FOR SCI IN SCHOOL, HOW OFTEN WORK WITH OTHERS?	X	X	X
SUBJ0026	K811605	WO001034	FOR SCI IN SCHOOL, HOW OFTEN GIVE ORAL REPORT?	X	X	X
SUBJ0027	K811606	WO001035	FOR SCI IN SCHOOL, HOW OFTEN GIVE WRITTEN REPORT?	X	X	X
SUBJ0028	K811607	WO001036	FOR SCI IN SCHOOL, HOW OFTEN DO HANDS-ON PROJECT?	X	-	-
SUBJ0029	K811608	WO001037	FOR SCI IN SCHOOL, HOW OFTEN DISCUSS RESULTS?	X	-	-
SUBJ0030	K811609	WO001038	FOR SCI IN SCHOOL, HOW OFTEN DO YOU USE COMPUTER?	X	X	X
SUBJ0031	K811610	WO001039	FOR SCI IN SCHOOL, HOW OFTEN TAKE TEST OR QUIZ?	X	X	X
SUBJ0032	K811611	WO001040	FOR SCI IN SCHOOL, HOW OFTEN DO YOU USE LIBRARY?	X	X	X
SUBJ0033	K811612	WO001041	FOR SCI IN SCHOOL, HOW OFTEN OBSERVE/MEAS OUTSIDE?	X	X	X
SUBJ0034	K811701	WO001043	HOW OFTEN DOES SCIENCE TEACHER TALK TO CLASS?	X	X	X
SUBJ0035	K811702	WO001044	HOW OFTEN DOES SCIENCE TEACHER DO DEMONSTRATION?	X	X	X
SUBJ0036	K811703	WO001045	HOW OFTEN DOES SCIENCE TEACHER SHOW VIDEO OR TV?	X	X	X
SUBJ0037	K811704	WO001046	HOW OFTEN DOES SCIENCE TEACHER USE COMPUTER?	X	X	X
SUBJ0038	K811705	WO001047	HOW OFTEN DOES SCI TEACHER USE CD'S/LASER DISCS?	X	X	X
SUBJ0039	K811801	WO001048	HOW OFTEN DOES SCI CLASS GO ON A FIELD TRIP?	X	X	X
SUBJ0040	K811901	WO001049	HOW OFTEN DOES GUEST SPEAKER COME TO SCI CLASS?	X	X	X
SUBJ0041	SM00101	LC000075	ABOUT HOW MANY QUESTIONS RIGHT ON TEST?	X	X	X
SUBJ0042	SM00201	LC000076	HOW HARD TEST COMPARED TO THOSE IN SCHOOL?	X	X	X
SUBJ0043	SM00301	LC000077	HOW HARD DID YOU TRY ON TEST COMPARED TO OTHERS?	X	X	X
SUBJ0044	SM00401	LD000078	HOW IMPORTANT WAS IT YOU DO WELL ON THIS TEST?	X	X	X
SUBJ0045	SM00501	LC000079	HOW OFTEN HAD TO WRITE LONG ANSWERS TO QSTS?	X	X	X
BACK0079	B009701	HE002543	DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE	-	X	-
BACK0080	B009801	HE002544	HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?	-	X	-
BACK0081	B009501	HE003221	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	X	-	-
BACK0082	B009502	HE003222	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	X	-	-
BACK0083	B009601	HE003223	DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?	-	X	X
BACK0084	B009602	HE003224	DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?	-	X	X
SUBJ0046	K812101	LC000145	DO YOU/TEACHER SAVE YOUR SCI WORK IN A PORTFOLIO?	-	X	-
SUBJ0047	K812201	WO001050	HOW MUCH TIME WEEKLY SPENT ON SCIENCE HOMEWORK?	-	X	X
SUBJ0048	K811613	LD001451	FOR SCI IN SCHOOL, HOW OFTEN HANDS-ON ACTIVITIES?	-	X	X
SUBJ0049	K811614	LD001477	FOR SCI, HOW OFTEN DISCUSS HANDS-ON RESULTS?	-	X	X
SUBJ0050	K811615	WO001051	FOR SCI, DESIGN & CARRY OUT OWN INVESTIGATION?	-	X	X
BACK0085	B008301	LC000168	SINCE KDG, GRADES ATTENDED IN THIS STATE?	-	-	X
BACK0086	B009901	HE002548	DESCRIBE YOUR OVERALL GRADES SINCE 9TH GRADE	-	-	X
BACK0087	B008501	HE002549	WHICH BEST DESCRIBES YOUR HIGH SCHOOL PROGRAM	-	-	X
BACK0088	B005501	TB005501	WHAT WILL TAKE LARGEST AMT. OF TIME AFTER HIGH-SCH	-	-	X
BACK0089	MOTHOCC		KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?	-	-	X
BACK0090	B011A01	HE003220	KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?	-	-	X
BACK0091	FATHOCC		KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?	-	-	X
BACK0092	B012A02	BO001994	KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?	-	-	X
SUBJ0051	K812301	LD001446	DONE SCHOOL SCI INVEST/PROJECTS W/ LIVING THINGS?	-	-	X
SUBJ0052	K812302	LD001448	DONE SCHOOL SCI INVEST/PROJECTS W/ ELECTRICITY?	-	-	X
SUBJ0053	K812303	LD001449	DONE SCHOOL SCI INVEST/PROJECTS W/ CHEMICALS?	-	-	X

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SUBJ0054	K812304	LD001450	DONE SCHOOL SCI INVEST/PROJECTS W/ ROCKS/MINERALS?	-	-	X
SUBJ0055	K812305	LD001452	DONE SCI INVEST/PROJECTS W/ MAG. GLASS/MICROSCOPE?	-	-	X
SUBJ0056	K812306	LD001453	DONE SCI INVEST/PROJECTS W/ THERMOMETER/BAROMETER?	-	-	X
SUBJ0057	K812307	LD001454	DONE SCI INVEST/PROJECTS W/ SIMPLE MACHINES?	-	-	X
SUBJ0058	K812308	LD001455	DONE SCI PROJECTS W/ INSTRUMENTS MEAS. SPEED?	-	-	X
SUBJ0059	K812309	LD001456	DONE SCHOOL SCI INVEST/PROJECTS W/ NONE OF ABOVE?	-	-	X
SUBJ0060	K812401	LC000172	ARE YOU TAKING A SCIENCE COURSE THIS YEAR?	-	-	X
SUBJ0061	K812501	LC000175	SINCE 9TH GRADE, HOW MUCH GENERAL SCIENCE?	-	-	X
SUBJ0062	K812502	LC000181	SINCE 9TH GRADE, HOW MUCH EARTH & SPACE SCIENCE?	-	-	X
SUBJ0063	K812503	LC000176	SINCE 9TH GRADE, HOW MUCH BIOLOGY?	-	-	X
SUBJ0064	K812504	LC000177	SINCE 9TH GRADE, HOW MUCH LIFE SCIENCE (NOT BIO)?	-	-	X
SUBJ0065	K812505	LC000178	SINCE 9TH GRADE, HOW MUCH CHEMISTRY?	-	-	X
SUBJ0066	K812506	LC000179	SINCE 9TH GRADE, HOW MUCH PHYSICS?	-	-	X
SUBJ0067	K812507	LC000180	SINCE 9TH GRADE, HOW MUCH OTHER PHYSICAL SCIENCE?	-	-	X
SUBJ0068	K812508	WO001053	SINCE 9TH GRADE, HOW MUCH INTEGRATED SCIENCE?	-	-	X
SUBJ0069	K812509	WO001054	SINCE 9TH GRADE, HOW MUCH SCIENCE AND TECHNOLOGY?	-	-	X
SUBJ0070	K812510	WO001055	SINCE 9TH GRADE, HOW MANY OTHER SCIENCE COURSES?	-	-	X
SUBJ0071	K812601	LC000182	ENROLLED IN SCIENCE ADVANCED PLACEMENT COURSE?	-	-	X
SUBJ0072	K812701	LC000186	DONE SCI INVEST/PROJECTS IN SCHOOL 1 WK OR MORE?	-	-	X
SUBJ0073	K811616	WO001058	HOW OFTEN ANALYZE OWN SCI DATA, FORM CONCLUSIONS?	-	-	X
SCHL0003	C030901	HE000839	BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?	X	-	-
SCHL0004	C037101	HE000840	4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT LEVEL?	X	-	-
SCHL0005	C031212	HE002000	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?	X	-	-
SCHL0006	C031205	HE002002	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?	X	-	-
SCHL0007	C031213	LD001554	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?	X	-	-
SCHL0008	C031214	LD001555	HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?	X	-	-
SCHL0009	C031603	HE000861	HAS MATH BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0010	C031607	LC000469	HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0011	C031601	HE000859	HAS READING BEEN IDENTIFIED AS A PRIORITY?	X	-	-
SCHL0012	C031610	LD001556	HAS ARTS BEEN IDENTIFIED AS A PRIORITY?	X	X	-
SCHL0013	C031606	HE000958	HAS SUBJECT INTEGRATION BEEN A PRIORITY?	X	X	-
SCHL0014	C035701	HE000843	COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?	X	X	X
SCHL0015	C035702	HE000864	COMPUTERS GROUPED IN SEPARATE LAB AND AVAILABLE?	X	X	X
SCHL0016	C035703	HE000866	COMPUTERS AVAILABLE TO BRING TO ROOM WHEN NEEDED?	X	X	X
SCHL0017	C037201	HE002006	SCHOOL W/ SPECIAL FOCUS ON MATH?	X	X	X
SCHL0018	C037202	HE002008	SCHOOL W/ SPECIAL FOCUS ON SCIENCE?	X	X	X
SCHL0019	C037207	LD001557	SCHOOL W/ SPECIAL FOCUS ON MATH?	X	-	-
SCHL0020	C037204	LD001558	SCHOOL W/ SPECIAL FOCUS ON ARTS?	X	X	X
SCHL0021	C037205	HE002011	SCHOOL W/ SPECIAL FOCUS ON OTHER?	X	X	X
SCHL0022	C037206	HE002012	SCHOOL NOT A SPECIAL FOCUS SCHOOL?	X	X	X
SCHL0023	C037301	HE002014	SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?	X	X	X
SCHL0024	C037302	HE002016	SCHOOL FOLLOW DISTRICT/STATE SCIENCE CURRICULUM?	X	X	X
SCHL0025	C037303	LD001559	SCHOOL FOLLOW DISTRICT/STATE READING CURRICULUM?	X	-	-
SCHL0026	C037304	LD001560	SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?	X	X	X
SCHL0027	C037305	HE002019	SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?	X	X	X
SCHL0028	C037401	HE002021	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?	X	-	-
SCHL0029	C037402	HE002023	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?	X	-	-
SCHL0030	C037403	LD001561	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?	X	-	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0031	C037404	LD001562	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?	X	-	-
SCHL0032	C037405	HE002026	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?	X	-	-
SCHL0033	C037406	HE002027	SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE ABOVE?	X	-	-
SCHL0034	C037501	HE002029	4TH GRADERS IN EXTRACURR ACTS FOR MATH?	X	-	-
SCHL0035	C037502	HE002031	4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	X	-	-
SCHL0036	C037503	LD001563	4TH GRADERS IN EXTRACURR ACTS FOR READING?	X	-	-
SCHL0037	C037504	LD001564	4TH GRADERS IN EXTRACURR ACTS FOR ARTS?	X	-	-
SCHL0038	C037505	HE002034	4TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?	X	-	-
SCHL0039	C037601	HE002036	4TH GRADERS IN SUMMER PROGRAMS IN MATH?	X	-	-
SCHL0040	C037602	HE002038	4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	X	-	-
SCHL0041	C037603	LD001565	4TH GRADERS IN SUMMER PROGRAMS IN READING?	X	-	-
SCHL0042	C037604	LD001566	4TH GRADERS IN SUMMER PROGRAMS IN ARTS?	X	-	-
SCHL0043	C037605	HE002041	4TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	X	-	-
SCHL0044	C036601	LC000502	WHICH BEST DESCRIBES PRIMARY WAY LIBRARY STAFFED?	X	X	X
SCHL0045	C032207	HE000875	INVOLVE PARENTS AS AIDES IN CLASSROOM?	X	X	X
SCHL0046	C032209	LC000482	HAVE PARENTS REVIEW/SIGN HOMEWORK?	X	X	X
SCHL0047	C032210	LC000484	ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?	X	X	X
SCHL0048	C032211	LC000486	HAVE A PARENT VOLUNTEER PROGRAM?	X	X	X
SCHL0049	C037701	HE002142	WHAT % OF PARENTS IN PARENT-TEACHER ORGS?	X	X	X
SCHL0050	C037702	HE002108	WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL NIGHT?	X	X	X
SCHL0051	C037703	HE002109	WHAT % OF PARENTS IN PARENT-TEACHER COMFERENCES?	X	X	X
SCHL0052	C037704	HE002110	WHAT % PARENTS INVOLVED MAKING CURRICULUM DECISION	X	X	X
SCHL0053	C037705	HE002111	WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?	X	X	X
SCHL0054	C032402	HE000888	IS STUDENT ABSENTEEISM A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0055	C032401	HE000887	IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0056	C032404	HE000890	ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0057	C032406	HE000892	IS TEACHER ABSENTEEISM A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0058	C032407	HE000893	ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0059	C032408	HE000894	IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0060	C032409	HE002121	IS LACK OF PARENT INVLMT A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0061	C032410	HE002122	IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0062	C032411	HE002123	IS STUDENT TOBACCO USE A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0063	C032412	HE002124	IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0064	C032413	HE002125	ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0065	C032414	HE002126	IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0066	C032415	HE002127	IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?	X	X	X
SCHL0067	C032502	HE000897	IS TEACHER MORALE POS. OR NEG.?	X	X	X
SCHL0068	C032503	HE000898	ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?	X	X	X
SCHL0069	C032505	HE000900	IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?	X	X	X
SCHL0070	C032506	HE000901	IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?	X	X	X
SCHL0071	C033601	HE000917	% ABSENT ON AVERAGE DAY?	X	X	X
SCHL0072	C036501	LC000488	WHAT % OF TEACHERS ABSENT ON GIVEN DAY?	X	X	X
SCHL0073	C037801	HE000918	% OF STUDS EROLLED AT START OF YR EROLLED AT END?	X	X	X
SCHL0074	C037901	HE002112	% OF 4TH GRADERS HELD BACK & REPEATING 4TH GRADE?	X	-	-
SCHL0075	C038001	HE000920	% OF FULL TIME TEACHERS LEFT BEFORE END OF YR?	X	X	X
SCHL0076	C038301	HE002094	IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?	X	X	X
SCHL0077	C038801	WP000069	SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?	X	X	X
SCHL0078	C034101	HE002143	DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X	X

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0079	C034102	HE002113	DID HEADMASTER/HEADMISTRESS FILL OUT QUESTIONNAIRE	X	X	X
SCHL0080	C034103	HE002114	DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0081	C034104	HE002115	DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0082	C034105	HE002116	DID COUNSELOR FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0083	C034106	HE002117	DID CURRICULUM COORD FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0084	C034107	HE002118	DID TEACHER FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0085	C034108	HE002119	DID SECRETARY FILL OUT THIS QUESTIONNAIRE	X	X	X
SCHL0086	C034109	HE002120	DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE	X	X	X
TCHR0001	T055901	HE001004	WHAT IS YOUR GENDER?	X	X	-
TCHR0002	T056001	LD001610	WHICH BEST DESRIBES YOU?	X	X	-
TCHR0003	T040301	HE001007	YEARS TAUGHT	X	X	-
TCHR0004	T056101	LD001500	HOW MANY YRS TOTAL YOU TAUGHT MATH?	X	-	-
TCHR0005	T056102	LD001501	HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?	X	-	-
TCHR0006	T056201	HE002551	TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?	X	X	-
TCHR0007	T040501	HE001010	CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS ED?	X	X	-
TCHR0008	T040506	HE002552	DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?	X	-	-
TCHR0009	T040504	HE001082	DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?	X	-	-
TCHR0010	T040507	HE002553	CERTIFICATION, ELEMENTARY SCIENCE?	X	X	-
TCHR0011	T040508	HE002554	CERTIFICATION, MIDDLE/JUNIOR SCIENCE	X	X	-
TCHR0012	T040505	HE002555	CERTIFICATION, OTHER	X	X	-
TCHR0013	T056301	HE001012	HIGHEST ACADEMIC DEGREE YOU HOLD?	X	X	-
TCHR0014	T040701	HE002556	EDUCATION UNDERGRAD MAJOR	X	X	-
TCHR0015	T040706	HE002557	ELMENT ED UNDERGRAD MAJOR	X	X	-
TCHR0016	T040707	HE002558	SEC ED UNDERGRAD MAJOR	X	X	-
TCHR0017	T040703	HE002559	WAS YOUR UNDERGRADUATE MAJOR MATH?	X	-	-
TCHR0018	T040704	HE002560	WAS YOUR UNDERGRADUATE MAJOR MATH ED?	X	-	-
TCHR0019	T040710	HE002561	SCIENCE ED UNDERGRAD MAJOR	X	X	-
TCHR0020	T040711	HE002562	LIFE SCIENCE UNDERGRAD MAJOR?	X	X	-
TCHR0021	T040712	HE002563	PHYSICAL SCIENCE UNDERGRAD MAJOR?	X	X	-
TCHR0022	T040713	HE002564	EARTH SCIENCE UNDERGRAD MAJOR?	X	X	-
TCHR0023	T040708	HE002565	SPECIAL EDUCATION UNDERGRAD MAJOR	X	X	-
TCHR0024	T040709	HE002566	BILINGUAL ED/ESL UNDERGRAD MAJOR	X	X	-
TCHR0025	T040705	HE002567	OTHER UNDERGRAD MAJOR	X	X	-
TCHR0026	T040801	HE002568	EDUCATION GRAD MAJOR	X	X	-
TCHR0027	T040807	HE002569	ELEMENTARY ED GRAD MAJOR	X	X	-
TCHR0028	T040808	HE002570	SECONDARY ED GRAD MAJOR	X	X	-
TCHR0029	T040803	HE002571	WAS YOUR GRADUATE MAJOR MATHEMATICS?	X	-	-
TCHR0030	T040804	HE002572	WAS YOUR GRADUATE MAJOR MATH ED?	X	-	-
TCHR0031	T040814	HE002573	SCIENCE ED GRAD MAJOR?	X	X	-
TCHR0032	T040815	HE002574	LIFE SCIENCE GRAD MAJOR?	X	X	-
TCHR0033	T040816	HE002575	PHYSICAL SCIENCE GRAD MAJOR?	X	X	-
TCHR0034	T040817	HE002576	EARTH SCIENCE GRAD MAJOR?	X	X	-
TCHR0035	T040809	HE002577	SPECIAL ED GRAD MAJOR	X	X	-
TCHR0036	T040810	HE002578	BILINGUAL GRAD MAJOR	X	X	-
TCHR0037	T040811	HE002579	ADMIN/SUPERVISION GRAD MAJOR	X	X	-
TCHR0038	T040812	HE002580	CURRICULUM/INSTRUCTION GRAD MAJOR?	X	X	-
TCHR0039	T040813	LD001506	COUNSELING GRAD MAJOR?	X	X	-
TCHR0040	T040805	HE002581	OTHER GRAD MAJOR	X	X	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TCHR0041	T040806	HE002582	NO GRADUATE STUDY	X	X	-
TCHR0042	T056401	HE002584	UNDERGRAD/GRAD MINOR STUDY-EDUCATION	X	X	-
TCHR0043	T056402	HE002585	UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED	X	X	-
TCHR0044	T056403	HE002586	UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED	X	X	-
TCHR0045	T056404	HE002587	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS	X	-	-
TCHR0046	T056405	HE002588	UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED	X	X	-
TCHR0047	T056413	HE002589	UNDERGRAD/GRAD MINOR STUDY-SCIENCE ED	X	X	-
TCHR0048	T056414	HE002590	UNDERGRAD/GRAD MINOR STUDY-LIFE SCIENCE	X	X	-
TCHR0049	T056415	HE002591	UNDERGRAD/GRAD MINOR STUDY-PHYSICAL SCIENCE	X	X	-
TCHR0050	T056416	HE002592	UNDERGRAD/GRAD MINOR STUDY-EARTH SCIENCE	X	-	-
TCHR0051	T056406	HE002593	UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED	X	X	-
TCHR0052	T056407	HE002594	UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED	X	X	-
TCHR0053	T056408	HE002595	UNDERGRAD/GRAD MINOR STUDY-ADMIN & SUPERVISION	X	X	-
TCHR0054	T056409	HE002596	UNDERGRAD/GRAD MINOR STUDY-CURRICULUM & INSTRUC	X	X	-
TCHR0055	T056410	LD001509	UNDERGRAD/GRAD MINOR STUDY-COUNSELING	X	X	-
TCHR0056	T056411	HE002597	UNDERGRAD/GRAD MINOR STUDY-OTHER	X	X	-
TCHR0057	T056412	HE002598	UNDERGRAD/GRAD MINOR STUDY-NONE	X	X	-
TCHR0058	T056501	HE002599	LAST YR, HOW MUCH TIME IN MATH/MATH ED SEM/WRKSHP?	X	-	-
TCHR0059	T058101	he002600	LAST YR, HOW MUCH TIME IN SCI/SCI ED SEM/WRKSHPS?	X	-	-
TCHR0060	T056601	HE002601	LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?	X	-	-
TCHR0061	T058201	HE002602	LAST 2 YRS, HOW MANY SCI/SCI ED UNIV COURSES?	X	-	-
TCHR0062	T056701	HE002604	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM USE	X	X	-
TCHR0063	T056702	HE002605	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE	X	X	-
TCHR0064	T056703	HE002606	PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP INSTRCT	X	X	-
TCHR0065	T056704	HE002607	PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT	X	X	-
TCHR0066	T056705	HE002608	PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT	X	X	-
TCHR0067	T056706	HE002609	PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED ASSMNT	X	X	-
TCHR0068	T056707	HE002610	PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER THKG	X	X	-
TCHR0069	T056708	HE002611	PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT BKGD	X	X	-
TCHR0070	T056709	HE002612	PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS	X	X	-
TCHR0071	T056710	HE002613	PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED STDS	X	X	-
TCHR0072	T056711	HE002614	PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG	X	X	-
TCHR0073	T056712	HE002615	PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES	X	X	-
TCHR0074	T056713	HE002616	PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE	X	X	-
TCHR0075	T041201	HE001022	AVAILABILITY OF RESOURCES	X	X	-
TCHR0076	T041302	LD001512	ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?	X	-	-
TCHR0077	T041303	LD001513	SCIENCE CURRICULUM SPECIALIST	X	-	-
TCHR0078	T056801	HE001251	HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?	X	X	-
TCHR0079	T060201	WO001016	HOW MANY YRS TAUGHT SCI IN PUB/PRIV SCHOOLS?	X	-	-
TCHR0080	T060301	WO001018	METHODS OF TCHING SCI? COLLEGE COURSE	X	X	-
TCHR0081	T060311	WO001018	METHODS OF TCHING SCI?WRKSHP >1 WK	X	X	-
TCHR0082	T060321	WO001018	METHODS OF TCHING SCI?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0083	T060331	WO001018	METHODS OF TCHING SCI?WRKSHP <= 1 DAY	X	X	-
TCHR0084	T060341	WO001018	METHODS OF TCHING SCI?OTHER PROF. DEV	X	X	-
TCHR0085	T060302	WO001019	UNIV COURSES IN-BIO/LIFE SCI? COLLEGE COURSE	X	X	-
TCHR0086	T060312	WO001019	UNIV COURSES IN-BIO/LIFE SCI?WRKSHP >1 WK	X	X	-
TCHR0087	T060322	WO001019	UNIV COURSES IN-BIO/LIFE SCI?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0088	T060332	WO001019	UNIV COURSES IN-BIO/LIFE SCI?WRKSHP <= 1 DAY	X	X	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TCHR0089	T060342	WO001019	UNIV COURSES IN-BIO/LIFE SCI?OTHER PROF. DEV	X	X	-
TCHR0090	T060303	WO001020	UNIV COURSES IN-CHEMISTRY? COLLEGE COURSE	X	X	-
TCHR0091	T060313	WO001020	UNIV COURSES IN-CHEMISTRY?WRKSHP >1 WK	X	X	-
TCHR0092	T060323	WO001020	UNIV COURSES IN-CHEMISTRY?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0093	T060333	WO001020	UNIV COURSES IN-CHEMISTRY?WRKSHP <= 1 DAY	X	X	-
TCHR0094	T060343	WO001020	UNIV COURSES IN-CHEMISTRY?OTHER PROF. DEV	X	X	-
TCHR0095	T060304	WO001021	UNIV COURSES IN-PHYSICS? COLLEGE COURSE	X	X	-
TCHR0096	T060314	WO001021	UNIV COURSES IN-PHYSICS?WRKSHP >1 WK	X	X	-
TCHR0097	T060324	WO001021	UNIV COURSES IN-PHYSICS?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0098	T060334	WO001021	UNIV COURSES IN-PHYSICS?WRKSHP <= 1 DAY	X	X	-
TCHR0099	T060344	WO001021	UNIV COURSES IN-PHYSICS?OTHER PROF. DEV	X	X	-
TCHR0100	T060305	WO001022	UNIV COURSES IN-EARTH SCI? COLLEGE COURSE	X	X	-
TCHR0101	T060315	WO001022	UNIV COURSES IN-EARTH SCI?WRKSHP >1 WK	X	X	-
TCHR0102	T060325	WO001022	UNIV COURSES IN-EARTH SCI?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0103	T060335	WO001022	UNIV COURSES IN-EARTH SCI?WRKSHP <= 1 DAY	X	X	-
TCHR0104	T060345	WO001022	UNIV COURSES IN-EARTH SCI?OTHER PROF. DEV	X	X	-
TCHR0105	T060306	WO001023	UNIV COURSES-OTHER TYPES OF SCI? COLLEGE COURSE	X	X	-
TCHR0106	T060316	WO001023	UNIV COURSES-OTHER TYPES OF SCI?WRKSHP >1 WK	X	X	-
TCHR0107	T060326	WO001023	UNIV COURSES-OTHR TYPES OF SCI?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0108	T060336	WO001023	UNIV COURSES-OTHER TYPES OF SCI?WRKSHP <= 1 DAY	X	X	-
TCHR0109	T060346	WO001023	UNIV COURSES-OTHER TYPES OF SCI?OTHER PROF. DEV	X	X	-
TCHR0110	T060307	WO001024	UNIV COURSES IN-NONE OF ABOVE? COLLEGE COURSE	X	X	-
TCHR0111	T060317	WO001024	UNIV COURSES IN-NONE OF ABOVE?WRKSHP >1 WK	X	X	-
TCHR0112	T060327	WO001024	UNIV COURSES IN-NONE OF ABOVE?WRKSHP <1 WK >1 DAY	X	X	-
TCHR0113	T060337	WO001024	UNIV COURSES IN-NONE OF ABOVE?WRKSHP <= 1 DAY	X	X	-
TCHR0114	T060347	WO001024	UNIV COURSES IN-NONE OF ABOVE?OTHER PROF. DEV	X	X	-
TCHR0115	T060401	WO001026	PAST 5 YRS, COURSES/ACTVTS IN-COMP USE TO GET DATA	X	X	-
TCHR0116	T060402	WO001027	PAST 5 YRS, COURSES/ACTVTS IN-COMP DATA ANALYSIS?	X	X	-
TCHR0117	T060403	WO001028	PAST 5 YRS, COURSES/ACTVTS IN-MULTIMEDIA SCI ED?	X	X	-
TCHR0118	T060404	WO001029	PAST 5 YRS, COURSES/ACTVTS IN-LAB MNGMT/SAFETY?	X	X	-
TCHR0119	T060405	WO001030	PAST 5 YRS, COURSES/ACTVTS IN-INTEGRATED SCI INST?	X	X	-
TCHR0120	T060501	WO001031	YOU BELONG TO 1 OR > SCI RELATED SCI ORGS?	X	X	-
TSUB0001	T060601	HE002415	HOW OFTEN STUDS READ SCI TEXTBOOK?	X	X	-
TSUB0002	T060602	HE002416	HOW OFTEN STUDS READ BOOK/MAN ABOUT SCI?	X	X	-
TSUB0003	T060603	HE002417	HOW OFTEN STUDS DISCUSS SCI IN THE NEWS?	X	X	-
TSUB0004	T060604	HE002418	HOW OFTEN STUDS WORK W/ OTHER STUDS ON ACT/PROJCT?	X	X	-
TSUB0005	T060605	HE002419	HOW OFTEN STUDS GIVE ORAL SCI REPORT?	X	X	-
TSUB0006	T060606	HE002420	HOW OFTEN STUDS PREPARE A WRITTEN SCI REPORT?	X	X	-
TSUB0007	T060607	HE002421	HOW OFTEN STUDS DO HANDS ON SCI ACTIVITIES IN SCI?	X	X	-
TSUB0008	T060608	HE002422	HOW OFTEN STUDS TALK ABOUT MEASURES/RESULTS?	X	X	-
TSUB0009	T060609	HE002423	HOW OFTEN STUDS TAKE SCI TEST OR QUIZ?	X	X	-
TSUB0010	T060610	HE002424	HOW OFTEN STUDS USE LIBRARY RESOURCES FOR SCI?	X	X	-
TSUB0011	T060611	HE002425	HOW OFTEN STUDS USE COMPUTERS FOR SCI?	X	X	-
TSUB0012	T060701	HE002427	HOW OFTEN DO YOU TALK TO CLASS ABOUT SCI?	X	X	-
TSUB0013	T060702	HE002428	HOW OFTEN DO YOU DO A SCI DEMONSTRATION?	X	X	-
TSUB0014	T060703	HE002429	HOW OFTEN DO YOU SHOW A SCI VIDEOTAPE/TV PROGRAM?	X	X	-
TSUB0015	T060704	HE002432	HOW OFTEN DO YOU USE COMPUTERS FOR SCI?	X	X	-
TSUB0016	T060705	HE002430	HOW OFTEN DO YOU USE CDS OR LASER DISKS ON SCI?	X	X	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TSUB0017	T060801	HE002431	HOW OFTEN YOUR SCI STUDS GO ON SCI FIELD TRIPS?	X	X	-
TSUB0018	T060901	HE002433	HOW OFTEN DO YOU BRING GUEST SPEAKER FOR SCI STUDS	X	X	-
TSUB0019	T061001	HE002434	SAVE STUDS SCI WORK IN PORTFOLIOS FOR ASSESSMENT?	X	X	-
TSUB0020	T061101	HE002436	HOW MUCH EMPHASIS-KNOWING SCI FACTS/TERMS?	X	X	-
TSUB0021	T061102	HE002437	HOW MUCH EMPHASIS-UNDERSTANDING KEY SCI CONCEPTS?	X	X	-
TSUB0022	T061103	HE002438	HOW MUCH EMPHASIS-DEVELOP SCI PROB SOLVING SKILL?	X	X	-
TSUB0023	T061104	HE002439	HOW MUCH EMPHASIS-SCI RELEVANCE TO SOCIETY/TECH?	X	X	-
TSUB0024	T061105	HE002440	HOW MUCH EMPHASIS-COMMUNICATE IDEAS IN SCI?	X	X	-
TSUB0025	T061106	HE002441	HOW MUCH EMPHASIS-DEVELOPING LAB SKILLS?	X	X	-
TSUB0026	T061107	HE002442	HOW MUCH EMPHASIS-DEVELOPING STUDS SCI INTEREST?	X	X	-
TSUB0027	T061108	HE002443	HOW MUCH EMPHASIS-DEVELOPING DATA ANALYSIS SKILLS	X	X	-
TSUB0028	T061109	HE002444	HOW MUCH EMPHASIS-USING TECH AS SCI TOOL?	X	X	-
TSUB0029	T061201	HE002445	EVER ASSIGN SOLO/GROUP SCI PROJECTS THAT TAKE >WK?	X	X	-
TSUB0030	T061301	HE002447	HOW OFTEN USE MULT CHOICE TESTS TO ACCESS?	X	X	-
TSUB0031	T061302	HE002448	HOW OFTEN USE SHOR/LONG WRITTEN RESPONSE TO ACCESS	X	X	-
TSUB0032	T061303	HE002449	HOW OFTEN USE SOLO PROJECTS TO ACCESS?	X	X	-
TSUB0033	T061304	HE002450	HOW OFTEN USE GROUP PROJECTS TO ACCESS?	X	X	-
TSUB0034	T061305	HE002451	HOW OFTEN USE WORK PORTFOLIOS TO ACCESS?	X	X	-
TSUB0035	T061306	HE002452	HOW OFTEN USE IN CLASS ESSAYS TO ACCESS?	X	X	-
TSUB0036	T061307	HE002453	HOW OFTEN USE SELF/PEER EVAL TO ACCESS?	X	X	-
TSUB0037	T061308	HE002454	HOW OFTEN USE LAB NOTEBOOKS/JOURNALS TO ACCESS?	X	X	-
TSUB0038	T061309	HE002455	HOW OFTEN USE HOMEWORK TO ACCESS?	X	X	-
TSUB0039	T061310	HE002456	HOW OFTEN USE HANDS ON ACTIVITIES TO ACCESS?	X	X	-
TSUB0040	T061401	HE002457	PROPORTION OF EVAL IN SCI BASED ON HANDS ON ACTVS?	X	X	-
TSUB0041	T061501	HE002458	BEST DESCRIPTION OF COMPUTER AVAILABILITY FOR SCI	X	X	-
TSUB0042	T061601	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: PLAYING SCI	X	X	-
TSUB0043	T061611	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: PLAYING SCI	X	X	-
TSUB0044	T061621	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: SIMULATIONS	X	X	-
TSUB0045	T061631	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: DATA ANALYSIS	X	X	-
TSUB0046	T061641	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: WORD PROCESS	X	X	-
TSUB0047	T061651	HE002459	USE COMPUTERS FOR SCI INSTRUCTION: DO NOT USE	X	X	-
TSUB0048	T061701	HE002460	STUDS ASSIGNED TO CLASS BY ABILITY/ACHVMNT LEVEL?	X	X	-
TSUB0049	T061801	HE002461	IF ASSIGNED BY ABILITY WHICH BEST DESCRIBES LEVEL?	X	X	-
TSUB0050	T061901	HE002462	COMPOSITION OF CLASS ACCORDING TO GENDER?	X	X	-
TSUB0051	T062001	HE002463	HOW MUCH TIME CLASS SPEND ON LIFE SCIENCE?	X	X	-
TSUB0052	T062002	HE002463	HOW MUCH TIME CLASS SPEND ON EARTH SCIENCE?	X	X	-
TSUB0053	T062003	HE002463	HOW MUCH TIME CLASS SPEND ON PHYSICAL SCIENCE?	X	X	-
TSUB0054	T062101	HE002464	WHICH BEST DESCRIBES SPACE WHERE CLASS TAUGHT?	X	X	-
TSUB0055	T062201	HE002466	DO STUDS PRODUCE NOTEBOOKS/REPORTS OF LAB WORK?	X	X	-
TSUB0056	T062202	HE002467	DO STUDS PRODUCE REPORTS OF EXTENDED SCI PROJECTS?	X	X	-
TSUB0057	T062203	HE002468	DO STUDS PRODUCE REPORTS ON SPECIFIC TOPIC/ISSUE?	X	X	-
TSUB0058	T062204	HE002469	DO STUDS PRODUCE REPORTS/RECORDS OF FIELD TRIPS?	X	X	-
TSUB0059	T062205	HE002470	DO STUDS PRODUCE JOURNALS/DIARIES/LOGS OF IDEAS?	X	X	-
TSUB0060	T062206	HE002471	DO STUDS PRODUCE PHOTO RECORDS OF PROJECTS?	X	X	-
TSUB0061	T062207	HE002472	DO STUDS PRODUCE AUDIO/VIDEOTAPE RECORDS OF ACTVS?	X	X	-
TSUB0062	T062208	HE002473	DO STUDS PRODUCE REPORTS OF PERSONAL INTERVIEWS?	X	X	-
TSUB0063	T062209	HE002474	DO STUDS PRODUCE 3D SCI MODELS?	X	X	-
TSUB0064	T062210	HE002475	DO STUDS PRODUCE COMP GENERATED MULTMEDIA PROJECTS	X	X	-

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
TSUB0065	T062301	HE002476	TIME PER WEEK EXPECT STUD TO SPEND ON HOMEWORK?	X	X	-
TSUB0066	T062401	LD001465	CLASS PERIOD AND # OF STUDS IN CLASS	X	X	-
SCHL0087	C034201	HE000926	BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?	-	X	-
SCHL0088	C034402	HE002232	ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?	-	X	-
SCHL0089	C034403	HE002234	ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?	-	X	-
SCHL0090	C034401	LD001571	ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?	-	X	-
SCHL0091	C034406	LD001572	ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?	-	X	-
SCHL0092	C034510	HE002146	HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?	-	X	-
SCHL0093	C034511	HE002148	HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?	-	X	-
SCHL0094	C034512	HE002149	HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?	-	X	-
SCHL0095	C034513	LD001573	HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?	-	X	-
SCHL0096	C034514	LD001574	HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?	-	X	-
SCHL0097	C031611	LD001575	HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?	-	X	-
SCHL0098	C034601	HE000935	SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?	-	X	-
SCHL0099	C037203	LD001557	SCHOOL W/ SPECIAL FOCUS ON ENGLISH?	-	X	X
SCHL0100	C037306	LD001577	SCHOOL FOLLOW DISTRICT/STATE ENGLISH CURRICULUM?	-	X	X
SCHL0101	C039401	HE002155	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?	-	X	-
SCHL0102	C039402	HE002157	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?	-	X	-
SCHL0103	C039403	LD001578	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?	-	X	-
SCHL0104	C039404	LD001579	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?	-	X	-
SCHL0105	C039405	HE002160	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?	-	X	-
SCHL0106	C039406	HE002161	SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE ABOVE?	-	X	-
SCHL0107	C039501	HE002164	8TH GRADERS IN EXTRACURR ACTS FOR MATH?	-	X	-
SCHL0108	C039502	HE002166	8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?	-	X	-
SCHL0109	C039503	LD001580	8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG ARTS?	-	X	-
SCHL0110	C039504	LD001581	8TH GRADERS IN EXTRACURR ACTS FOR ARTS?	-	X	-
SCHL0111	C039505	HE002169	8TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?	-	X	-
SCHL0112	C039601	HE002172	8TH GRADERS IN SUMMER PROGRAMS IN MATH?	-	X	-
SCHL0113	C039602	HE002174	8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	-	X	-
SCHL0114	C039603	LD001582	8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG ARTS?	-	X	-
SCHL0115	C039604	LD001583	8TH GRADERS IN SUMMER PROGRAMS IN ARTS?	-	X	-
SCHL0116	C039605	HE002177	8TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	-	X	-
SCHL0117	C041901	HE002230	WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?	-	X	-
TCHR0121	T062501	LC000419	COUNTING THIS YR, HOW MANY YRS TOTAL TAUGHT SCI?	-	X	-
TCHR0122	T062601	HE002600	LAST YR, TIME IN PRO WORKSHOPS/SEMS IN SCI?	-	X	-
TCHR0123	T062701	HE002602	LAST 2 YRS, # OF UNIV COURSES IN SCI/SCI ED?	-	X	-
TCHR0124	T062801	HE002618	CURRICULUM SPECIALIST TO HELP/ADVISE IN SCI?	-	X	-
SCHL0118	C035002	HE002247	ARE 12TH-GRADERS ASSIGNED TO MATH BY ABILITY?	-	-	X
SCHL0119	C035003	HE002249	ARE 12TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?	-	-	X
SCHL0120	C035006	LD001588	ARE 12TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?	-	-	X
SCHL0121	C035007	LD001589	ARE 12TH-GRADERS ASSIGNED TO ARTS BY ABILITY?	-	-	X
SCHL0122	C040201	HE002253	FROM 9TH ON HOW MANY YRS REQUIRED FOR MATH?	-	-	X
SCHL0123	C040202	HE002254	FROM 9TH ON HOW MANY YRS REQUIRED FOR SCIENCE?	-	-	X
SCHL0124	C040203	LD001590	FROM 9TH ON HOW MANY YRS REQUIRED FOR ENG/LIT?	-	-	X
SCHL0125	C040204	HE002255	FROM 9TH ON HOW MANY YRS REQUIRED FINE/PERF ARTS?	-	-	X
SCHL0126	C040301	HE002256	COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED BIO?	-	-	X
SCHL0127	C040302	HE002257	COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED CHEM?	-	-	X
SCHL0128	C040303	HE002258	COURSES 1 OR > SEMESTERS TAUGHT IN ADV PHYSICS?	-	-	X

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0129	C040304	HE002259	NO ADVANCED SCIENCE COURSES TAUGHT	-	-	X
SCHL0130	C040305	WP000094	COURSES 1 OR > SEMESTERS TAUGHT IN COMP SCI?	-	-	X
SCHL0131	C040306	LC000512	COURSES 1 OR > SEMESTERS TAUGHT IN CALCULUS?	-	-	X
SCHL0132	C040307	WP000095	COURSES 1 OR > SEMESTERS TAUGHT IN TRIGONOMETRY?	-	-	X
SCHL0133	C040308	WP000096	COURSES 1 OR > SEMESTERS TAUGHT IN PRECALCULUS?	-	-	X
SCHL0134	C040309	LC000511	COURSES 1 OR > SEMESTERS TAUGHT IN PROB/STAT?	-	-	X
SCHL0135	C040310	WP000098	COURSES 1 OR > SEMESTERS TAUGHT IN UNI/INTEG MATH?	-	-	X
SCHL0136	C040311	HE002260	NO ADVANCED MATH COURSES TAUGHT?	-	-	X
SCHL0137	C040401	HE002272	STUDS REQUIRED TO PASS STATE TEST IN MATH?	-	-	X
SCHL0138	C040402	HE002273	STUDS REQUIRED TO PASS STATE TEST IN SCIENCE?	-	-	X
SCHL0139	C040403	LD001591	STUDS REQUIRED TO PASS STATE TEST IN ENG/LANG ARTS	-	-	X
SCHL0140	C040404	HE002274	STUDS REQUIRED TO PASS STATE TEST IN FINE/PERF ART	-	-	X
SCHL0141	C040501	HE002277	SCHOOL SPONSER 12TH GR FIELD TRIPS FOR MATH?	-	-	X
SCHL0142	C040502	HE002279	SCHOOL SPONSER 12TH GR FIELD TRIPS FOR SCIENCE?	-	-	X
SCHL0143	C040503	LD001592	SCHOOL SPONSER 12TH GR FIELD TRIPS IN ENG/LANG ART	-	-	X
SCHL0144	C040504	LD001593	SCHOOL SPONSER 12TH GR FIELD TRIPS IN ARTS?	-	-	X
SCHL0145	C040505	HE002286	SCHOOL SPONSER 12TH GR FIELD TRIPS IN OTHER?	-	-	X
SCHL0146	C040506	HE002288	SCHOOL SPONSER 12TH GR FIELD TRIPS IN NONE ABOVE?	-	-	X
SCHL0147	C040601	HE002296	12TH GRADERS IN EXTRACURR ACTS IN MATH?	-	-	X
SCHL0148	C040602	HE002288	12TH GRADERS IN EXTRACURR ACTS IN SCIENCE?	-	-	X
SCHL0149	C040603	LD001594	12TH GRADERS IN EXTRACURR ACTS IN ENG/LANG ARTS?	-	-	X
SCHL0150	C040604	LD001595	12TH GRADERS IN EXTRACURR ACTS IN ARTS?	-	-	X
SCHL0151	C040605	HE002291	12TH GRADERS IN EXTRACURR ACTS IN NONE OF ABOVE?	-	-	X
SCHL0152	C040701	HE002294	12TH GRADERS IN SUMMER PROGRAMS IN MATH?	-	-	X
SCHL0153	C040702	HE002296	12TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?	-	-	X
SCHL0154	C040703	LD001596	12TH GRADERS IN SUMMER PORGRAMS IN ENG/LANG ARTS?	-	-	X
SCHL0155	C040704	LD001597	12TH GRADERS IN SUMMER PROGRAMS IN ARTS?	-	-	X
SCHL0156	C040705	HE002299	12TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?	-	-	X
SCHL0157	C040801	HE002346	# STUDS ENROLLED IN AP SCIENCE COURSES?	-	-	X
SCHL0158	C040802	HE002347	# STUDS ENROLLED IN AP CALCULUS COURSES?	-	-	X
SCHL0159	C040803	HE002350	# STUDS ENROLLED IN AP COMP SCI COURSES?	-	-	X
SCHL0160	C040804	LD001598	# STUDS ENROLLED IN AP ENGLISH COURSES?	-	-	X
SCHL0161	C040901	HE002353	ANY 12TH GRDS TAKING COLLEGE COURSES IN MATH?	-	-	X
SCHL0162	C040902	HE002355	ANY 12TH GRDS TAKING COLLEGE COURSES IN SCIENCE?	-	-	X
SCHL0163	C040903	LD001599	ANY 12TH GRDS TAKING COLLEGE COURSES ENG/LANG ARTS	-	-	X
SCHL0164	C040904	LD001600	ANY 12TH GRDS TAKING COLLEGE COURSES IN ARTS?	-	-	X
SCHL0165	C040905	HE002358	ANY 12TH GRDS TAKING COLLEGE COURSES IN NONE ABOVE	-	-	X
SCHL0166	C041001	HE002359	WHAT % 12TH GRDS HELD BACK AND REPEAT 12TH GRADE?	-	-	X
SCHL0167	C041101	HE003193	LAST YR WHAT % OF 12TH GRDS GRADUATED?	-	-	X
SCHL0168	C036001	HE001002	WHAT % OF GRADUATING CLASS NOW IN 2-YR COLLEGE?	-	-	X
SCHL0169	C036002	HE001003	WHAT % OF GRADUATING CLASS NOW IN 4-YR COLLEGE?	-	-	X
SCHL0170	C036003	HE002360	WHAT % OF GRADUATING CLASS NOW IN VO-TEC SCHOOL?	-	-	X
SCHL0171	C036004	HE002361	WHAT % OF GRAD CLASS NOW IN EMPLOYER TRAINING?	-	-	X
SCHL0172	C036005	HE002362	% OF GRADUATING CLASS NOW IN MILITARY SERVICE?	-	-	X
SCHL0173	NTLUNSC		PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	X	X
SCHL0174	NTLUNSC		PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	X	X
SCHL0175	REMRDSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING	X	X	X
SCHL0176	REMRDSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING	X	X	X

Table C-3 (continued)

Summary Table of the 1996 Science Conditioning Variable Specifications

Conditioning ID	NAEP ID	TDDC ID	Description	Grade 4	Grade 8	Grade 12
SCHL0177	REMMHSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH	X	X	X
SCHL0178	REMMHSC		PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH	X	X	X
SCHL0179	NTLUNGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	-	-
SCHL0180	NTLUNGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	X	-	-
SCHL0181	REMRDGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING	X	-	-
SCHL0182	REMRDGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING	X	-	-
SCHL0183	REMMHGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH	X	-	-
SCHL0184	REMMHGR		PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH	X	-	-
SCHL0185	NTLUNGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	X	-
SCHL0186	NTLUNGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	X	-
SCHL0187	REMRDGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING	-	X	-
SCHL0188	REMRDGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING	-	X	-
SCHL0189	REMMHGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH	-	X	-
SCHL0190	REMMHGR		PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH	-	X	-
SCHL0191	NTLUNGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	-	X
SCHL0192	NTLUNGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM	-	-	X
SCHL0193	REMRDGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING	-	-	X
SCHL0194	REMRDGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING	-	-	X
SCHL0195	REMMHGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH	-	-	X
SCHL0196	REMMHGR		PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH	-	-	X

Table C-4

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   BACK0001
DESCRIPTION:                GRAND MEAN
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     OVERALL
NAEP ID:                    BKSER                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:           OTHER                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 OVERALL  (@            ) 1                          GRAND MEAN

CONDITIONING VARIABLE ID:   BACK0002
DESCRIPTION:                DERIVED SEX
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     GENDER                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    DSEX                        NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS
                                                        MALE
001 MALE     (1            ) 0                          FEMALE
002 FEMALE   (2            ) 1

CONDITIONING VARIABLE ID:   BACK0003
DESCRIPTION:                DERIVED RACE/ETHNICITY
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     RACE/ETH                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
NAEP ID:                    DRACE                       NUMBER OF INDEPENDENT CONTRASTS:        3
TYPE OF CONTRAST:           CLASS
                                                        RACE/ETHNICITY:  WHITE, AMERICAN INDIAN/ALASKAN
001 WHI/AI/O (1,5,6        ) 000                        NATIVE, OTHER, MISSING, UNCLASSIFIED
                                                        RACE/ETHNICITY:  BLACK
002 BLACK    (2            ) 100                        RACE/ETHNICITY:  HISPANIC
003 HISPANIC (3            ) 010                        RACE/ETHNICITY:  ASIAN
004 ASIAN    (4            ) 001

CONDITIONING VARIABLE ID:   BACK0004
DESCRIPTION:                IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     HISPANIC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
NAEP ID:                    B003101                     NUMBER OF INDEPENDENT CONTRASTS:        4
TYPE OF CONTRAST:           CLASS
                                                        HISPANIC:  NOT HISPANIC
001 NOT HISP (1            ) 0000                       HISPANIC:  MEXICAN, MEXICAN AMERICAN, CHICANO
002 MEXICAN  (2            ) 1000                       HISPANIC:  PUERTO RICAN
003 PUER RIC (3            ) 0100                       HISPANIC:  CUBAN, OTHER
004 CUBN,OTH (4,5          ) 0010                       HISPANIC:  MISSING
005 HISP-?   (M            ) 0001

CONDITIONING VARIABLE ID:   BACK0005
DESCRIPTION:                MSA/NON-MSA
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     MSANAT                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    TOL8                        NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS
                                                        MSA
001 MSA      (1,2,3,4,7,9) 0                            NON-MSA
002 NON MSA  (5,6,8        ) 1

CONDITIONING VARIABLE ID:   BACK0006
DESCRIPTION:                TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     TOL5                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
NAEP ID:                    TOL5                        NUMBER OF INDEPENDENT CONTRASTS:        4
TYPE OF CONTRAST:           CLASS
                                                        TOL5:  LARGE CITY
001 BIG CTY5 (1            ) 0000                       TOL5:  MID-SIZE CITY
002 MID CTY5 (2,M          ) 1000                       TOL5:  URBAN FRINGE OF LARGE CITY, URBAN FRINGE OF
003 FR/BTWN5 (3            ) 0100                       MID-SIZE CITY
                                                        TOL5:  SMALL TOWN
004 SML TWN5 (4            ) 0010                       TOL5:  RURAL (MSA AND NON-MSA)
005 RURAL5   (5            ) 0001

CONDITIONING VARIABLE ID:   BACK0007
DESCRIPTION:                DESCRIPTION OF COMMUNITY
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     DOC                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
NAEP ID:                    DOC                         NUMBER OF INDEPENDENT CONTRASTS:        3
TYPE OF CONTRAST:           CLASS
                                                        DOC:  BIG CITY
001 BIG CITY (1            ) 000                        DOC:  URBAN FRINGE
002 URBAN FR (2            ) 100                        DOC:  MEDIUM CITY
003 MED CITY (3,9,M        ) 010                        DOC:  SMALL PLACE
004 SM PLACE (4            ) 001

CONDITIONING VARIABLE ID:   BACK0008
DESCRIPTION:                PARENTS' HIGHEST LEVEL OF EDUCATION
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     PARED                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
NAEP ID:                    PARED                       NUMBER OF INDEPENDENT CONTRASTS:        4
TYPE OF CONTRAST:           CLASS
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 < HS      (1           ) 0000
002 HS GRAD   (2           ) 1000            PARED:  LESS THAN HIGH SCHOOL
003 POST HS   (3           ) 0100            PARED:  HIGH SCHOOL GRADUATE
004 COL GRAD  (4           ) 0010            PARED:  POST HIGH SCHOOL
005 PARED-?   (5,M         ) 0001            PARED:  COLLEGE GRADUATE
                                             PARED:  MISSING, I DON'T KNOW

CONDITIONING VARIABLE ID:  BACK0009
DESCRIPTION:               REGION OF THE COUNTRY
GRADES/ASSESSMENTS:        N04, N08, N12
CONDITIONING VAR LABEL:    REGION
NAEP ID:                   REGION
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
                                                NUMBER OF INDEPENDENT CONTRASTS:         3
001 N EAST    (1           ) 000
002 S EAST    (2           ) 100                REGION:  NORTHEAST
003 CENTRAL   (3           ) 010                REGION:  SOUTHEAST
004 WEST      (4,5         ) 001                REGION:  CENTRAL
                                                REGION:  WEST, TERRITORIES (NONE)

CONDITIONING VARIABLE ID:  BACK0010
DESCRIPTION:               SCHOOL TYPE (PQ)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SCHTYPE
NAEP ID:                   SCHTYPE
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
                                                NUMBER OF INDEPENDENT CONTRASTS:         2
001 PUBLIC    (1           ) 00
002 PRIVATE   (2,4,5,M     ) 10                 SCHOOL TYPE:  PUBLIC
                                                SCHOOL TYPE:  PRIVATE, BUREAU OF INDIAN AFFAIRS,
003 CATHOLIC  (3           ) 01                 DEPARTMENT OF DEFENSE, MISSING
                                                SCHOOL TYPE:  CATHOLIC
CONDITIONING VARIABLE ID:  BACK0011
DESCRIPTION:               INDIVIDUALIZED EDUCATION PROGRAM
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    IEP
NAEP ID:                   IEP
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
                                                NUMBER OF INDEPENDENT CONTRASTS:         1
001 IEP-YES   (1           ) 0
002 IEP-NO    (2           ) 1                  IEP:  YES
                                                IEP:  NO
CONDITIONING VARIABLE ID:  BACK0012
DESCRIPTION:               LIMITED ENGLISH PROFICIENCY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    LEP
NAEP ID:                   LEP
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
                                                NUMBER OF INDEPENDENT CONTRASTS:         1
001 LEP-YES   (1           ) 0
002 LEP-NO    (2           ) 1                  LEP:  YES
                                                LEP:  NO
CONDITIONING VARIABLE ID:  BACK0013
DESCRIPTION:               CHAPTER 1 (BOOK COVER)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    CHAPTER1
NAEP ID:                   CHAP1
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
                                                NUMBER OF INDEPENDENT CONTRASTS:         1
001 CHAP1-Y   (1           ) 0
002 CHAP1-N   (2           ) 1                  CHAPTER 1:  YES
                                                CHAPTER 1:  NO
CONDITIONING VARIABLE ID:  BACK0014
DESCRIPTION:               DO YOU RECEIVE A FREE OR REDUCED-PRICE LUNCH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    LUNCH
NAEP ID:                   SLUNCH
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                NUMBER OF INDEPENDENT CONTRASTS:         4
001 NOT ELIG  (1           ) 0000
002 RED PRIC  (2           ) 1000               LUNCH PROGRAM:  NOT ELIGIBLE
003 FREE      (3           ) 0100               LUNCH PROGRAM:  REDUCED PRICE
004 INFO N/A  (4,M         ) 0010               LUNCH PROGRAM:  FREE
005 SCH/REF   (5           ) 0001               LUNCH PROGRAM:  INFO NOT AVAILABLE
                                                LUNCH PROGRAM:  SCHOOL REFUAL
CONDITIONING VARIABLE ID:  BACK0015
DESCRIPTION:               HOW OFTEN DO THE PEOPLE IN YOUR HOME SPEAK A LANGUAGE OTHER THAN ENGLISH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMELANG
NAEP ID:                   B003201
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
                                                NUMBER OF INDEPENDENT CONTRASTS:         3
001 HL-NEVER  (1           ) 000
002 HL-SOME   (2           ) 100                HOMELANG:  NEVER
003 HL-ALWAY  (3           ) 010                HOMELANG:  SOMETIMES
004 HL-?      (M           ) 001                HOMELANG:  ALWAYS
                                                HOMELANG:  MISSING
CONDITIONING VARIABLE ID:  BACK0016
DESCRIPTION:               DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT HOME?
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       B008901                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:              CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 B008901Y (01          ) 000                         YES
002 B008901N (02          ) 100                         NO
003 B008901I (03          ) 010                         IDK25 (FILL 1 SHELF)
004 B008901M (M           ) 001                         MISSING

CONDITIONING VARIABLE ID:  BACK0017
DESCRIPTION:               HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (LINEAR)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    TVWATCHL
NAEP ID:                   B001801                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 TVLIN-0  (1           ) 0                           TV WATCHING (LINEAR) (0 TO 6+ HOURS PER DAY)
002 TVLIN-1  (2           ) 1                           TV WATCHING (LINEAR)
003 TVLIN-2  (3           ) 2                           TV WATCHING (LINEAR)
004 TVLIN-3  (4,M         ) 3                           TV WATCHING (LINEAR)
005 TVLIN-4  (5           ) 4                           TV WATCHING (LINEAR)
006 TVLIN-5  (6           ) 5                           TV WATCHING (LINEAR)
007 TVLIN-6  (7           ) 6                           TV WATCHING (LINEAR)

CONDITIONING VARIABLE ID:  BACK0018
DESCRIPTION:               HOW MUCH TELEVISION DO YOU USUALLY WATCH EACH DAY? (QUADRATIC)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    TVWATCHQ
NAEP ID:                   B001801                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          QUADRATIC                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 TV-QUAD  (1-7,M=4     )  1.0 + -2.0*X +  1.0*X**2   TV WATCHING (QUADRATIC)

CONDITIONING VARIABLE ID:  BACK0019
DESCRIPTION:               HOMEWORK ASSIGNED?:  BASED ON TIME SPENT ON HOMEWORK EACH DAY.
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HWASSIGN
NAEP ID:                   B006601                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        2

001 HW-MISS  (M           ) 00                          HOMEWORK ASSIGNED?:  MISSING
002 HW-NO    (1           ) 10                          HOMEWORK ASSIGNED?:  NO
003 HW-YES   (2-5         ) 01                          HOMEWORK ASSIGNED?:  YES

CONDITIONING VARIABLE ID:  BACK0020
DESCRIPTION:               HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY? (LINEAR)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEWRKL
NAEP ID:                   B006601                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          LINEAR                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 HWLIN-0  (1,2,M       ) 0                           HOMEWORK (LINEAR):  DON'T HAVE ANY, DON'T DO ANY,
                                                        MISSING
002 HWLIN-1  (3           ) 1                           HOMEWORK (LINEAR):  1/2 HOUR OR LESS
003 HWLIN-2  (4           ) 2                           HOMEWORK (LINEAR):  1 HOUR
004 HWLIN-3  (5           ) 3                           HOMEWORK (LINEAR):  MORE THAN 1 HOUR

CONDITIONING VARIABLE ID:  BACK0021
DESCRIPTION:               HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY (QUADRATIC)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEWRKQ
NAEP ID:                   B006601                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          SCALE                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 HWQUAD-0 (1,2,M       ) 0                           HOMEWORK (QUADRATIC):  DON'T HAVE ANY, DON'T DO
                                                        ANY, MISSING
002 HWQUAD-1 (3           ) 1                           HOMEWORK (QUADRATIC):  1/2 HOUR OR LESS
003 HWQUAD-2 (4           ) 4                           HOMEWORK (QUADRATIC):  1 HOUR
004 HWQUAD-3 (5           ) 9                           HOMEWORK (QUADRATIC):  MORE THAN 1 HOUR

CONDITIONING VARIABLE ID:  BACK0022
DESCRIPTION:               NUMBER OF ITEMS IN THE HOME (NEWSPAPER, > 25 BOOKS, ENCYCLOPEDIA, MAGAZINES)
                           (DERIVED)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEITMS
NAEP ID:                   HOMEEN2                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        2

001 HITEM<=2 (1,M         ) 00                          ITEMS IN HOME:  ZERO TO TWO ITEMS, MISSING
002 HITEM=3  (2           ) 10                          ITEMS IN HOME:  THREE ITEMS
003 HITEM=4  (3           ) 01                          ITEMS IN HOME:  FOUR ITEMS

CONDITIONING VARIABLE ID:  BACK0023
DESCRIPTION:               DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    MOM@HOME
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
NAEP ID:                   B005601
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                        NUMBER OF INDEPENDENT CONTRASTS:        2
001 MOMHOM-Y (1          ) 00
002 MOMHOM-N (2          ) 10                           MOTHER AT HOME:  YES
003 MOMHOM-? (M          ) 01                           MOTHER AT HOME:  NO
                                                        MOTHER AT HOME:  MISSING

CONDITIONING VARIABLE ID:  BACK0024
DESCRIPTION:               DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    DAD@HOME
NAEP ID:                   B005701
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                        NUMBER OF INDEPENDENT CONTRASTS:        2
001 DADHOM-Y (1          ) 00
002 DADHOM-N (2          ) 10                           FATHER AT HOME:  YES
003 DADHOM-? (M          ) 01                           FATHER AT HOME:  NO
                                                        FATHER AT HOME:  MISSING

CONDITIONING VARIABLE ID:  BACK0025
DESCRIPTION:               HOW MANY DAYS OF SCHOOL MISSED LAST MONTH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SCH MISS
NAEP ID:                   S004001
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                        NUMBER OF INDEPENDENT CONTRASTS:        1
001 MISS->2  (3,4,5,M    ) 0
                                                        DAYS OF SCHOOL MISSED:  3-4, 5-10, 10 OR MORE
002 MISS-2<  (1,2        ) 1                            DAYS, MISSING
                                                        DAYS OF SCHOOL MISSED:  0-1, 2 DAYS

CONDITIONING VARIABLE ID:  BACK0026
DESCRIPTION:               HOW LONG LIVED IN THE UNITED STATES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    YRSINUSA
NAEP ID:                   B008001
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                        NUMBER OF INDEPENDENT CONTRASTS:        4
001 ALL MY L (1          ) 0000
002 USA >5   (2          ) 1000                         ALL MY LIFE
003 USA 3-5  (3          ) 0100                         LIVED IN US MORE THAN 5 YEARS
004 USA <3   (4          ) 0010                         LIVED IN US 3-5 YEARS
005 USA-?    (M          ) 0001                         LIVED IN US LESS THAN 3 YEARS
                                                        LIVED IN US MISSING

CONDITIONING VARIABLE ID:  BACK0027
DESCRIPTION:               HOW MANY GRADES IN THIS STATE? (4TH GRADE)
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:    STGRADE4
NAEP ID:                   B007601
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                        NUMBER OF INDEPENDENT CONTRASTS:        2
001 STGRD<1  (1,M        ) 00
002 STGRD1-2 (2          ) 10                           GRADES IN STATE:  LESS THAN 1 GRADE, MISSING
003 STGRD3>  (3          ) 01                           GRADES IN STATE:  1-2 GRADES
                                                        GRADES IN STATE:  3 OR MORE GRADES

CONDITIONING VARIABLE ID:  SCHL0001
DESCRIPTION:               SCHOOL LEVEL AVERAGE MATH NORMIT (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SCH NORM
NAEP ID:                   SCHNORM
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                        NUMBER OF INDEPENDENT CONTRASTS:        1
001 SCHNRM-? (M          ) 0
002 SCHNRM-Y (@          ) 1                            SCHOOL LEVEL AVERAGE MATH NORMIT MISSING
                                                        SCHOOL LEVEL AVERAGE MATH NORMIT NOT-MISSING

CONDITIONING VARIABLE ID:  SCHL0002
DESCRIPTION:               SCHOOL LEVEL AVERAGE MATH NORMIT
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    SNRM-LIN
NAEP ID:                   SCHNORM
TYPE OF CONTRAST:          SCALE                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                        NUMBER OF INDEPENDENT CONTRASTS:        1
001 SNRM-LIN (#          ) (F8.4)
002 SNRM-LIN (M          ) 0                            SCHOOL LEVEL AVERAGE MATH NORMIT MEAN
                                                        SCHOOL LEVEL AVERAGE MATH NORMIT MISSING

CONDITIONING VARIABLE ID:  BACK0028
DESCRIPTION:               HOW MANY GRADES IN THIS STATE (12TH GRADE)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    STGRAD12
NAEP ID:                   B008301
TYPE OF CONTRAST:          CLASS                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                        NUMBER OF INDEPENDENT CONTRASTS:        3
001 STGRD<1  (1,M        ) 000
002 STGRD1-2 (2          ) 100                          GRADES IN STATE:  LESS THAN 1 GRADE, MISSING
003 STGRD3-5 (3          ) 010                          GRADES IN STATE:  1-2 GRADES
004 STGRD6>  (4,5        ) 001                          GRADES IN STATE:  3-5 GRADES
                                                        GRADES IN STATE:  MORE THAN 5 GRADES

CONDITIONING VARIABLE ID:  BACK0029
DESCRIPTION:               HOW MANY TIMES HAVE YOU CHANGED SCHOOLS IN PAST TWO YEARS BECAUSE YOU MOVED?
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:      SCH CHGS
NAEP ID:                     B007301                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      4
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          3

001 SCHCHG-0 (1            ) 000                        SCHOOL CHANGES:  NONE
002 SCHCHG-1 (2            ) 100                        SCHOOL CHANGES:  ONE
003 SCHCHG-2 (3            ) 010                        SCHOOL CHANGES:  TWO
004 SCHCHG-3 (4,M          ) 001                        SCHOOL CHANGES:  THREE OR MORE, MISSING

CONDITIONING VARIABLE ID:    BACK0030
DESCRIPTION:                 HOW OFTEN DO YOU DISCUSS THINGS STUDIED IN SCHOOL WITH SOMEONE AT HOME?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:      DISC@HOM
NAEP ID:                     B007401                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      4
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          3

001 DIS@HOM1 (1            ) 000                        DISCUSS STUDIES AT HOME:  ALMOST EVERY DAY
002 DIS@HOM2 (2            ) 100                        DISCUSS STUDIES AT HOME:  ONCE OR TWICE A WEEK
003 DIS@HOM3 (3            ) 010                        DISCUSS STUDIES AT HOME:  ONCE OR TWICE A MONTH
004 DIS@HOM4 (4,M          ) 001                        DISCUSS STUDIES AT HOME:  NEVER OR HARDLY EVER,
                                                        MISSING

CONDITIONING VARIABLE ID:    BACK0031
DESCRIPTION:                 ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:      PGSREAD1
NAEP ID:                     B001101                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 PGS<6,?  (5,M          ) 0                          PAGES READ:  5 OR FEWER A DAY, MISSING
002 PGS>5    (1,2,3,4      ) 1                          PAGES READ:  6-10, 11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID:    BACK0032
DESCRIPTION:                 ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:      PGSREAD2
NAEP ID:                     B001101                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 PGS<11,? (4,5,M        ) 0                          PAGES READ:  6-10, 5 OR FEWER A DAY, MISSING
002 PGS>10   (1,2,3        ) 1                          PAGES READ:  11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID:    SUBJ0001
DESCRIPTION:                 WHAT KIND OF MATH CLASS ARE YOU TAKING THIS YEAR?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     MATTAKE                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          7

001 NO MATH  (01           ) 0000000                    NOT TAKING THIS YEAR
002 8TH GRD  (02           ) 1000000                    EIGHTH GRADE MATH
003 PREALG   (03           ) 0100000                    PREALGEBRA
004 ALGEBRA  (04           ) 0010000                    ALGEBRA
005 INT/SEQ  (05           ) 0001000                    INTEGRATED/SEQUENTAL
006 APPLIED  (06           ) 0000100                    APPLIED MATH
007 OTHER    (07           ) 0000010                    OTHER MATH CLASSUR
008 MISSING  (M            ) 0000001                    MISSING

CONDITIONING VARIABLE ID:    BACK0033
DESCRIPTION:                 WHICH BEST DESCRIBES YOUR HIGH-SCHOOL PROGRAM?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      HS PROG
NAEP ID:                     B008501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          4

001 GENERAL  (1            ) 0000                       HIGH SCHOOL PROGRAM:  GENERAL
002 ACADEMIC (2            ) 1000                       HIGH SCHOOL PROGRAM:  ACADEMIC/COLLEGE PREP
003 VOC/TECH (3            ) 0100                       HIGH SCHOOL PROGRAM:  VOCATIONAL OR TECHNICAL
004 OTHERPGM (4            ) 0010                       HIGH SCHOOL PROGRAM:  OTHER
005 HS PGM-? (M            ) 0001                       HIGH SCHOOL PROGRAM:  MISSING

CONDITIONING VARIABLE ID:    BACK0034
DESCRIPTION:                 SEMESTERS ENGLISH/LITERATURE/WRITING (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      SEM ENG
NAEP ID:                     B007101                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 SEMENG-? (M            ) 0                          ENGLISH SEMESTERS:  MISSING
002 SEMENG-^ (1-9          ) 1                          ENGLISH SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:    BACK0035
DESCRIPTION:                 NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING (LINEAR)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      #ENG-LIN                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      1
NAEP ID:                     B007101
```

Table C-4 (continued)
Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:            LINEAR                    NUMBER OF INDEPENDENT CONTRASTS:         1

001 #ENG-LIN (1-9,M=0    )  0.0 +  1.0*X               NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING
                                                       (LINEAR)

CONDITIONING VARIABLE ID:  BACK0036
DESCRIPTION:               SEMESTERS MATHEMATICS (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM MAT
NAEP ID:                   B007102                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:         4

001 SEMMAT01 (1,2,3      ) 0000                        MATH SEMEST ERS:  ZERO TO 2
002 SEMMAT02 (4,5        ) 1000                        MATH SEMESTERS:  3 OR 4
003 SEMMAT03 (6,7        ) 0100                        MATH SEMESTERS:  5 OR 6
004 SEMMAT04 (8,9        ) 0010                        MATH SEMESTERS:  7 OR MORE
005 SEMMAT-? (M          ) 0001                        MISSING

CONDITIONING VARIABLE ID:  BACK0037
DESCRIPTION:               NUMBER OF SEMESTERS MATHEMATICS (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #MAT-LIN
NAEP ID:                   B007102                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     1
TYPE OF CONTRAST:          LINEAR                      NUMBER OF INDEPENDENT CONTRASTS:         1

001 #MAT-LIN (1-9,M=0    )  0.0 +  1.0*X               NUMBER OF SEMESTERS MATHEMATICS (LINEAR)

CONDITIONING VARIABLE ID:  BACK0038
DESCRIPTION:               SEMESTERS SCIENCE (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM SCI
NAEP ID:                   B007103                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:         1

001 SEMSCI-? (M          ) 0                           SCIENCE SEMESTERS:  MISSING
002 SEMSCI-^ (1-9        ) 1                           SCIENCE SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0039
DESCRIPTION:               NUMBER OF SEMESTERS SCIENCE (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #SCI-LIN
NAEP ID:                   B007103                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     1
TYPE OF CONTRAST:          LINEAR                      NUMBER OF INDEPENDENT CONTRASTS:         1

001 #SCI-LIN (1-9,M=0    )  0.0 +  1.0*X               NUMBER OF SEMESTERS SCIENCE (LINEAR)

CONDITIONING VARIABLE ID:  BACK0040
DESCRIPTION:               SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM HIS
NAEP ID:                   B007104                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:         1

001 SEMHIS-? (M          ) 0                           HISTORY SEMESTERS:  MISSING
002 SEMHIS-^ (1-9        ) 1                           HISTORY SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0041
DESCRIPTION:               NUMBER OF SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #HIS-LIN
NAEP ID:                   B007104                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     1
TYPE OF CONTRAST:          LINEAR                      NUMBER OF INDEPENDENT CONTRASTS:         1

001 #HIS-LIN (1-9,M=0    )  0.0 +  1.0*X               NUMBER OF SEMESTERS HISTORY/SOCIAL
                                                       STUDIES/GEOGRAPHY (LINEAR)

CONDITIONING VARIABLE ID:  BACK0042
DESCRIPTION:               SEMESTERS FOREIGN LANGUAGES (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM FLG
NAEP ID:                   B007105                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:         1

001 SEMFLG-? (M          ) 0                           FOREIGN LANGUAGE SEMESTERS:  MISSING
002 SEMFLG-^ (1-9        ) 1                           FOREIGN LANGUAGE SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0043
DESCRIPTION:               NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #FLG-LIN
NAEP ID:                   B007105                     TOTAL NUMBER OF SPECIFIED CONTRASTS:     1
TYPE OF CONTRAST:          LINEAR                      NUMBER OF INDEPENDENT CONTRASTS:         1

001 #FLG-LIN (1-9,M=0    )  0.0 +  1.0*X               NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)

CONDITIONING VARIABLE ID:  BACK0044
DESCRIPTION:               SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (MISSING VS NON-MISSING)
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:       SEM VOC
NAEP ID:                      B007106             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS               NUMBER OF INDEPENDENT CONTRASTS:        1

001 SEMVOC-? (M             ) 0                   VOC/TECH SEMESTERS:  MISSING
002 SEMVOC-^ (1-9           ) 1                   VOC/TECH SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:     BACK0045
DESCRIPTION:                  NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (LINEAR)
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:       #VOC-LIN
NAEP ID:                      B007106             TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:             LINEAR              NUMBER OF INDEPENDENT CONTRASTS:        1

001 #VOC-LIN (1-9,M=0       )  0.0 +  1.0*X       NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS
                                                  EDUCATION (LINEAR)

CONDITIONING VARIABLE ID:     BACK0046
DESCRIPTION:                  SEMESTERS ART/MUSIC (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:       SEM ART
NAEP ID:                      B007107             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS               NUMBER OF INDEPENDENT CONTRASTS:        1

001 SEMART-? (M             ) 0                   ART/MUSIC SEMESTERS:  MISSING
002 SEMART-^ (1-9           ) 1                   ART/MUSIC SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:     BACK0047
DESCRIPTION:                  NUMBER OF SEMESTERS ART/MUSIC (LINEAR)
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:       #ART-LIN
NAEP ID:                      B007107             TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:             LINEAR              NUMBER OF INDEPENDENT CONTRASTS:        1

001 #ART-LIN (1-9,M=0       )  0.0 +  1.0*X       NUMBER OF SEMESTERS ART/MUSIC (LINEAR)

CONDITIONING VARIABLE ID:     BACK0048
DESCRIPTION:                  INTERACTION:  GENDER BY RACE/ETHNICITY
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:       GEND/RAC
NAEP ID:                      N/A                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:             INTERACTION         NUMBER OF INDEPENDENT CONTRASTS:        3

001 G/R 11    (11           ) 010101              GEND/RAC INTACT: 1. MALE     1. WHI/AI/O
002 G/R 12    (12           ) -10000              GEND/RAC INTACT: 1. MALE     2. BLACK
003 G/R 13    (13           ) 00-100              GEND/RAC INTACT: 1. MALE     3. HISPANIC
004 G/R 14    (14           ) 0000-1              GEND/RAC INTACT: 1. MALE     4. ASIAN
005 G/R 21    (21           ) -1-1-1              GEND/RAC INTACT: 2. FEMALE   1. WHI/AI/O
006 G/R 22    (22           ) 010000              GEND/RAC INTACT: 2. FEMALE   2. BLACK
007 G/R 23    (23           ) 000100              GEND/RAC INTACT: 2. FEMALE   3. HISPANIC
008 G/R 24    (24           ) 000001              GEND/RAC INTACT: 2. FEMALE   4. ASIAN

CONDITIONING VARIABLE ID:     BACK0049
DESCRIPTION:                  INTERACTION:  GENDER BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:       GEND/TOL
NAEP ID:                      N/A                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   10
TYPE OF CONTRAST:             INTERACTION         NUMBER OF INDEPENDENT CONTRASTS:        4

001 G/T 11    (11           ) 01010101            GEND/TOL INTACT: 1. MALE     1. BIG CTY5
002 G/T 12    (12           ) -1000000            GEND/TOL INTACT: 1. MALE     2. MID CTY5
003 G/T 13    (13           ) 00-10000            GEND/TOL INTACT: 1. MALE     3. FR/BTWN5
004 G/T 14    (14           ) 0000-100            GEND/TOL INTACT: 1. MALE     4. SML TWN5
005 G/T 15    (15           ) 000000-1            GEND/TOL INTACT: 1. MALE     5. RURAL5
006 G/T 21    (21           ) -1-1-1-1            GEND/TOL INTACT: 2. FEMALE   1. BIG CTY5
007 G/T 22    (22           ) 01000000            GEND/TOL INTACT: 2. FEMALE   2. MID CTY5
008 G/T 23    (23           ) 00010000            GEND/TOL INTACT: 2. FEMALE   3. FR/BTWN5
009 G/T 24    (24           ) 00000100            GEND/TOL INTACT: 2. FEMALE   4. SML TWN5
010 G/T 25    (25           ) 00000001            GEND/TOL INTACT: 2. FEMALE   5. RURAL5

CONDITIONING VARIABLE ID:     BACK0050
DESCRIPTION:                  INTERACTION:  GENDER BY PARENTS' EDUCATION
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:       GEND/PAR
NAEP ID:                      N/A                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   10
TYPE OF CONTRAST:             INTERACTION         NUMBER OF INDEPENDENT CONTRASTS:        4

001 G/P 11    (11           ) 01010101            GEND/PAR INTACT: 1. MALE     1. < HS
002 G/P 12    (12           ) -1000000            GEND/PAR INTACT: 1. MALE     2. HS GRAD
003 G/P 13    (13           ) 00-10000            GEND/PAR INTACT: 1. MALE     3. POST HS
004 G/P 14    (14           ) 0000-100            GEND/PAR INTACT: 1. MALE     4. COL GRAD
005 G/P 15    (15           ) 000000-1            GEND/PAR INTACT: 1. MALE     5. PARED-?
006 G/P 21    (21           ) -1-1-1-1            GEND/PAR INTACT: 2. FEMALE   1. < HS
007 G/P 22    (22           ) 01000000            GEND/PAR INTACT: 2. FEMALE   2. HS GRAD
008 G/P 23    (23           ) 00010000            GEND/PAR INTACT: 2. FEMALE   3. POST HS
009 G/P 24    (24           ) 00000100            GEND/PAR INTACT: 2. FEMALE   4. COL GRAD
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
010 G/P 25    (25            ) 00000001                    GEND/PAR INTACT: 2. FEMALE   5. PARED-?

CONDITIONING VARIABLE ID:  BACK0051
DESCRIPTION:               INTERACTION:  GENDER BY SCHOOL TYPE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    GEND/SCH
NAEP ID:                   N/A                         TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:          INTERACTION                 NUMBER OF INDEPENDENT CONTRASTS:          2

001 G/S 11    (11            ) 0101                        GEND/SCH INTACT: 1. MALE     1. PUBLIC
002 G/S 12    (12            ) -100                        GEND/SCH INTACT: 1. MALE     2. PRIVATE
003 G/S 13    (13            ) 00-1                        GEND/SCH INTACT: 1. MALE     3. CATHOLIC
004 G/S 21    (21            ) -1-1                        GEND/SCH INTACT: 2. FEMALE   1. PUBLIC
005 G/S 22    (22            ) 0100                        GEND/SCH INTACT: 2. FEMALE   2. PRIVATE
006 G/S 23    (23            ) 0001                        GEND/SCH INTACT: 2. FEMALE   3. CATHOLIC

CONDITIONING VARIABLE ID:  BACK0052
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/TOL
NAEP ID:                   N/A                         TOTAL NUMBER OF SPECIFIED CONTRASTS:     20
TYPE OF CONTRAST:          INTERACTION                 NUMBER OF INDEPENDENT CONTRASTS:         12

001 R/T 11    (11            ) 010101010101010101010101    RACE/TOL INTACT: 1. WHI/AI/O 1. BIG CTY5
002 R/T 12    (12            ) -1000000-1000000-1000000    RACE/TOL INTACT: 1. WHI/AI/O 2. MID CTY5
003 R/T 13    (13            ) 00-1000000-1000000-10000    RACE/TOL INTACT: 1. WHI/AI/O 3. FR/BTWN5
004 R/T 14    (14            ) 0000-1000000-1000000-100    RACE/TOL INTACT: 1. WHI/AI/O 4. SML TWN5
005 R/T 15    (15            ) 000000-1000000-1000000-1    RACE/TOL INTACT: 1. WHI/AI/O 5. RURAL5
006 R/T 21    (21            ) -1-1-1-1000000000000000     RACE/TOL INTACT: 2. BLACK    1. BIG CTY5
007 R/T 22    (22            ) 010000000000000000000000    RACE/TOL INTACT: 2. BLACK    2. MID CTY5
008 R/T 23    (23            ) 000100000000000000000000    RACE/TOL INTACT: 2. BLACK    3. FR/BTWN5
009 R/T 24    (24            ) 000001000000000000000000    RACE/TOL INTACT: 2. BLACK    4. SML TWN5
010 R/T 25    (25            ) 000000010000000000000000    RACE/TOL INTACT: 2. BLACK    5. RURAL5
011 R/T 31    (31            ) 00000000-1-1-1-100000000    RACE/TOL INTACT: 3. HISPANIC 1. BIG CTY5
012 R/T 32    (32            ) 000000000100000000000000    RACE/TOL INTACT: 3. HISPANIC 2. MID CTY5
013 R/T 33    (33            ) 000000000001000000000000    RACE/TOL INTACT: 3. HISPANIC 3. FR/BTWN5
014 R/T 34    (34            ) 000000000000010000000000    RACE/TOL INTACT: 3. HISPANIC 4. SML TWN5
015 R/T 35    (35            ) 000000000000000100000000    RACE/TOL INTACT: 3. HISPANIC 5. RURAL5
016 R/T 41    (41            ) 0000000000000000-1-1-1-1    RACE/TOL INTACT: 4. ASIAN    1. BIG CTY5
017 R/T 42    (42            ) 000000000000000001000000    RACE/TOL INTACT: 4. ASIAN    2. MID CTY5
018 R/T 43    (43            ) 000000000000000000010000    RACE/TOL INTACT: 4. ASIAN    3. FR/BTWN5
019 R/T 44    (44            ) 000000000000000000000100    RACE/TOL INTACT: 4. ASIAN    4. SML TWN5
020 R/T 45    (45            ) 000000000000000000000001    RACE/TOL INTACT: 4. ASIAN    5. RURAL5

CONDITIONING VARIABLE ID:  BACK0053
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY PARENTS' EDUCATION
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/PAR
NAEP ID:                   N/A                         TOTAL NUMBER OF SPECIFIED CONTRASTS:     20
TYPE OF CONTRAST:          INTERACTION                 NUMBER OF INDEPENDENT CONTRASTS:         12

001 R/P 11    (11            ) 010101010101010101010101    RACE/PAR INTACT: 1. WHI/AI/O 1. < HS
002 R/P 12    (12            ) -1000000-1000000-1000000    RACE/PAR INTACT: 1. WHI/AI/O 2. HS GRAD
003 R/P 13    (13            ) 00-1000000-1000000-10000    RACE/PAR INTACT: 1. WHI/AI/O 3. POST HS
004 R/P 14    (14            ) 0000-1000000-1000000-100    RACE/PAR INTACT: 1. WHI/AI/O 4. COL GRAD
005 R/P 15    (15            ) 000000-1000000-1000000-1    RACE/PAR INTACT: 1. WHI/AI/O 5. PARED-?
006 R/P 21    (21            ) -1-1-1-1000000000000000     RACE/PAR INTACT: 2. BLACK    1. < HS
007 R/P 22    (22            ) 010000000000000000000000    RACE/PAR INTACT: 2. BLACK    2. HS GRAD
008 R/P 23    (23            ) 000100000000000000000000    RACE/PAR INTACT: 2. BLACK    3. POST HS
009 R/P 24    (24            ) 000001000000000000000000    RACE/PAR INTACT: 2. BLACK    4. COL GRAD
010 R/P 25    (25            ) 000000010000000000000000    RACE/PAR INTACT: 2. BLACK    5. PARED-?
011 R/P 31    (31            ) 00000000-1-1-1-100000000    RACE/PAR INTACT: 3. HISPANIC 1. < HS
012 R/P 32    (32            ) 000000000100000000000000    RACE/PAR INTACT: 3. HISPANIC 2. HS GRAD
013 R/P 33    (33            ) 000000000001000000000000    RACE/PAR INTACT: 3. HISPANIC 3. POST HS
014 R/P 34    (34            ) 000000000000010000000000    RACE/PAR INTACT: 3. HISPANIC 4. COL GRAD
015 R/P 35    (35            ) 000000000000000100000000    RACE/PAR INTACT: 3. HISPANIC 5. PARED-?
016 R/P 41    (41            ) 0000000000000000-1-1-1-1    RACE/PAR INTACT: 4. ASIAN    1. < HS
017 R/P 42    (42            ) 000000000000000001000000    RACE/PAR INTACT: 4. ASIAN    2. HS GRAD
018 R/P 43    (43            ) 000000000000000000010000    RACE/PAR INTACT: 4. ASIAN    3. POST HS
019 R/P 44    (44            ) 000000000000000000000100    RACE/PAR INTACT: 4. ASIAN    4. COL GRAD
020 R/P 45    (45            ) 000000000000000000000001    RACE/PAR INTACT: 4. ASIAN    5. PARED-?

CONDITIONING VARIABLE ID:  BACK0054
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY SCHOOL TYPE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/SCH
NAEP ID:                   N/A                         TOTAL NUMBER OF SPECIFIED CONTRASTS:     12
TYPE OF CONTRAST:          INTERACTION                 NUMBER OF INDEPENDENT CONTRASTS:          6

001 R/S 11    (11            ) 010101010101                RACE/SCH INTACT: 1. WHI/AI/O 1. PUBLIC
002 R/S 12    (12            ) -100-100-100                RACE/SCH INTACT: 1. WHI/AI/O 2. PRIVATE
003 R/S 13    (13            ) 00-100-100-1                RACE/SCH INTACT: 1. WHI/AI/O 3. CATHOLIC
004 R/S 21    (21            ) -1-100000000                RACE/SCH INTACT: 2. BLACK    1. PUBLIC
005 R/S 22    (22            ) 010000000000                RACE/SCH INTACT: 2. BLACK    2. PRIVATE
006 R/S 23    (23            ) 000100000000                RACE/SCH INTACT: 2. BLACK    3. CATHOLIC
007 R/S 31    (31            ) 0000-1-10000                RACE/SCH INTACT: 3. HISPANIC 1. PUBLIC
008 R/S 32    (32            ) 000001000000                RACE/SCH INTACT: 3. HISPANIC 2. PRIVATE
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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009 R/S 33   (33          ) 000000010000                       RACE/SCH INTACT: 3. HISPANIC 3. CATHOLIC
010 R/S 41   (41          ) 00000000-1-1                       RACE/SCH INTACT: 4. ASIAN    1. PUBLIC
011 R/S 42   (42          ) 000000000100                       RACE/SCH INTACT: 4. ASIAN    2. PRIVATE
012 R/S 43   (43          ) 000000000001                       RACE/SCH INTACT: 4. ASIAN    3. CATHOLIC

CONDITIONING VARIABLE ID:   BACK0055
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY PARENT'S EDUCATION
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     TOL5/PAR
NAEP ID:                    N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
TYPE OF CONTRAST:           INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:        16

001 T/P 11   (11          ) 01010101010101010101010101010101 TOL5/PAR INTACT: 1. BIG CTY5 1. < HS
002 T/P 12   (12          ) -1000000-1000000-1000000-1000000 TOL5/PAR INTACT: 1. BIG CTY5 2. HS GRAD
003 T/P 13   (13          ) 00-1000000-1000000-1000000-10000 TOL5/PAR INTACT: 1. BIG CTY5 3. POST HS
004 T/P 14   (14          ) 0000-1000000-1000000-1000000-100 TOL5/PAR INTACT: 1. BIG CTY5 4. COL GRAD
005 T/P 15   (15          ) 000000-1000000-1000000-1000000-1 TOL5/PAR INTACT: 1. BIG CTY5 5. PARED-?
006 T/P 21   (21          ) -1-1-1-1000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 1. < HS
007 T/P 22   (22          ) 01000000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 2. HS GRAD
008 T/P 23   (23          ) 00010000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 3. POST HS
009 T/P 24   (24          ) 00000100000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 4. COL GRAD
010 T/P 25   (25          ) 00000001000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 5. PARED-?
011 T/P 31   (31          ) 00000000-1-1-1-10000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 1. < HS
012 T/P 32   (32          ) 00000000010000000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 2. HS GRAD
013 T/P 33   (33          ) 00000000000100000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 3. POST HS
014 T/P 34   (34          ) 00000000000001000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 4. COL GRAD
015 T/P 35   (35          ) 00000000000000010000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 5. PARED-?
016 T/P 41   (41          ) 0000000000000000-1-1-1-100000000 TOL5/PAR INTACT: 4. SML TWN5 1. < HS
017 T/P 42   (42          ) 00000000000000000001000000000000 TOL5/PAR INTACT: 4. SML TWN5 2. HS GRAD
018 T/P 43   (43          ) 00000000000000000000010000000000 TOL5/PAR INTACT: 4. SML TWN5 3. POST HS
019 T/P 44   (44          ) 00000000000000000000000100000000 TOL5/PAR INTACT: 4. SML TWN5 4. COL GRAD
020 T/P 45   (45          ) 00000000000000000000000001000000 TOL5/PAR INTACT: 4. SML TWN5 5. PARED-?
021 T/P 51   (51          ) 000000000000000000000000-1-1-1-1 TOL5/PAR INTACT: 5. RURAL5   1. < HS
022 T/P 52   (52          ) 00000000000000000000000001000000 TOL5/PAR INTACT: 5. RURAL5   2. HS GRAD
023 T/P 53   (53          ) 00000000000000000000000000010000 TOL5/PAR INTACT: 5. RURAL5   3. POST HS
024 T/P 54   (54          ) 00000000000000000000000000000100 TOL5/PAR INTACT: 5. RURAL5   4. COL GRAD
025 T/P 55   (55          ) 00000000000000000000000000000001 TOL5/PAR INTACT: 5. RURAL5   5. PARED-?

CONDITIONING VARIABLE ID:   BACK0056
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY SCHOOL TYPE
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     TOL5/SCH
NAEP ID:                    N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
TYPE OF CONTRAST:           INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:         8

001 T/S 11   (11          ) 0101010101010101                 TOL5/SCH INTACT: 1. BIG CTY5 1. PUBLIC
002 T/S 12   (12          ) -100-100-100-100                 TOL5/SCH INTACT: 1. BIG CTY5 2. PRIVATE
003 T/S 13   (13          ) 00-100-100-100-1                 TOL5/SCH INTACT: 1. BIG CTY5 3. CATHOLIC
004 T/S 21   (21          ) -1-1000000000000                 TOL5/SCH INTACT: 2. MID CTY5 1. PUBLIC
005 T/S 22   (22          ) 0100000000000000                 TOL5/SCH INTACT: 2. MID CTY5 2. PRIVATE
006 T/S 23   (23          ) 0001000000000000                 TOL5/SCH INTACT: 2. MID CTY5 3. CATHOLIC
007 T/S 31   (31          ) 0000-1-100000000                 TOL5/SCH INTACT: 3. FR/BTWN5 1. PUBLIC
008 T/S 32   (32          ) 0000010000000000                 TOL5/SCH INTACT: 3. FR/BTWN5 2. PRIVATE
009 T/S 33   (33          ) 0000000100000000                 TOL5/SCH INTACT: 3. FR/BTWN5 3. CATHOLIC
010 T/S 41   (41          ) 00000000-1-10000                 TOL5/SCH INTACT: 4. SML TWN5 1. PUBLIC
011 T/S 42   (42          ) 0000000001000000                 TOL5/SCH INTACT: 4. SML TWN5 2. PRIVATE
012 T/S 43   (43          ) 0000000000010000                 TOL5/SCH INTACT: 4. SML TWN5 3. CATHOLIC
013 T/S 51   (51          ) 000000000000-1-1                 TOL5/SCH INTACT: 5. RURAL5   1. PUBLIC
014 T/S 52   (52          ) 0000000000000100                 TOL5/SCH INTACT: 5. RURAL5   2. PRIVATE
015 T/S 53   (53          ) 0000000000000001                 TOL5/SCH INTACT: 5. RURAL5   3. CATHOLIC

CONDITIONING VARIABLE ID:   BACK0057
DESCRIPTION:                INTERACTION:  PARENTS' EDUCATION BY SCHOOL TYPE
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:     PARE/SCH
NAEP ID:                    N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
TYPE OF CONTRAST:           INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:         8

001 P/S 11   (11          ) 0101010101010101                 PARE/SCH INTACT: 1. < HS     1. PUBLIC
002 P/S 12   (12          ) -100-100-100-100                 PARE/SCH INTACT: 1. < HS     2. PRIVATE
003 P/S 13   (13          ) 00-100-100-100-1                 PARE/SCH INTACT: 1. < HS     3. CATHOLIC
004 P/S 21   (21          ) -1-1000000000000                 PARE/SCH INTACT: 2. HS GRAD  1. PUBLIC
005 P/S 22   (22          ) 0100000000000000                 PARE/SCH INTACT: 2. HS GRAD  2. PRIVATE
006 P/S 23   (23          ) 0001000000000000                 PARE/SCH INTACT: 2. HS GRAD  3. CATHOLIC
007 P/S 31   (31          ) 0000-1-100000000                 PARE/SCH INTACT: 3. POST HS  1. PUBLIC
008 P/S 32   (32          ) 0000010000000000                 PARE/SCH INTACT: 3. POST HS  2. PRIVATE
009 P/S 33   (33          ) 0000000100000000                 PARE/SCH INTACT: 3. POST HS  3. CATHOLIC
010 P/S 41   (41          ) 00000000-1-10000                 PARE/SCH INTACT: 4. COL GRAD 1. PUBLIC
011 P/S 42   (42          ) 0000000001000000                 PARE/SCH INTACT: 4. COL GRAD 2. PRIVATE
012 P/S 43   (43          ) 0000000000010000                 PARE/SCH INTACT: 4. COL GRAD 3. CATHOLIC
013 P/S 51   (51          ) 000000000000-1-1                 PARE/SCH INTACT: 5. PARED-?  1. PUBLIC
014 P/S 52   (52          ) 0000000000000100                 PARE/SCH INTACT: 5. PARED-?  2. PRIVATE
015 P/S 53   (53          ) 0000000000000001                 PARE/SCH INTACT: 5. PARED-?  3. CATHOLIC

CONDITIONING VARIABLE ID:   BACK0058
DESCRIPTION:                INTERACTION:  GENDER BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
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PY AVAILABLE

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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CONDITIONING VAR LABEL:   GEND/
NAEP ID:                  N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    16
TYPE OF CONTRAST:         INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:         7

001 G/  11   (11          ) 01010101010101             GEND/    INTACT: 1. MALE      1. NO MATH
002 G/  12   (12          ) -1000000000000             GEND/    INTACT: 1. MALE      2. 8TH GRD
003 G/  13   (13          ) 00-10000000000             GEND/    INTACT: 1. MALE      3. PREALG
004 G/  14   (14          ) 0000-100000000             GEND/    INTACT: 1. MALE      4. ALGEBRA
005 G/  15   (15          ) 000000-1000000             GEND/    INTACT: 1. MALE      5. INT/SEQ
006 G/  16   (16          ) 00000000-10000             GEND/    INTACT: 1. MALE      6. APPLIED
007 G/  17   (17          ) 0000000000-100             GEND/    INTACT: 1. MALE      7. OTHER
008 G/  18   (18          ) 000000000000-1             GEND/    INTACT: 1. MALE      8. MISSING
009 G/  21   (21          ) -1-1-1-1-1-1-1             GEND/    INTACT: 2. FEMALE    1. NO MATH
010 G/  22   (22          ) 01000000000000             GEND/    INTACT: 2. FEMALE    2. 8TH GRD
011 G/  23   (23          ) 00010000000000             GEND/    INTACT: 2. FEMALE    3. PREALG
012 G/  24   (24          ) 00000100000000             GEND/    INTACT: 2. FEMALE    4. ALGEBRA
013 G/  25   (25          ) 00000001000000             GEND/    INTACT: 2. FEMALE    5. INT/SEQ
014 G/  26   (26          ) 00000000010000             GEND/    INTACT: 2. FEMALE    6. APPLIED
015 G/  27   (27          ) 00000000000100             GEND/    INTACT: 2. FEMALE    7. OTHER
016 G/  28   (28          ) 00000000000001             GEND/    INTACT: 2. FEMALE    8. MISSING

CONDITIONING VARIABLE ID: BACK0060
DESCRIPTION:              INTERACTION:  RACE/ETHNICITY BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:       N08, S08
CONDITIONING VAR LABEL:   RACE/
NAEP ID:                  N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    32
TYPE OF CONTRAST:         INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        21

001 R/  11   (11          ) 333333333333333333333      RACE/    INTACT: 1. WHI/AI/O 1. NO MATH
002 R/  12   (12          ) 122222212222221222222      RACE/    INTACT: 1. WHI/AI/O 2. 8TH GRD
003 R/  13   (13          ) 212222221222222122222      RACE/    INTACT: 1. WHI/AI/O 3. PREALG
004 R/  14   (14          ) 221222222122222212222      RACE/    INTACT: 1. WHI/AI/O 4. ALGEBRA
005 R/  15   (15          ) 222122222212222221222      RACE/    INTACT: 1. WHI/AI/O 5. INT/SEQ
006 R/  16   (16          ) 222212222221222222122      RACE/    INTACT: 1. WHI/AI/O 6. APPLIED
007 R/  17   (17          ) 222221222222122222212      RACE/    INTACT: 1. WHI/AI/O 7. OTHER
008 R/  18   (18          ) 222222122222212222221      RACE/    INTACT: 1. WHI/AI/O 8. MISSING
009 R/  21   (21          ) 111111122222222222222      RACE/    INTACT: 2. BLACK    1. NO MATH
010 R/  22   (22          ) 322222222222222222222      RACE/    INTACT: 2. BLACK    2. 8TH GRD
011 R/  23   (23          ) 232222222222222222222      RACE/    INTACT: 2. BLACK    3. PREALG
012 R/  24   (24          ) 223222222222222222222      RACE/    INTACT: 2. BLACK    4. ALGEBRA
013 R/  25   (25          ) 222322222222222222222      RACE/    INTACT: 2. BLACK    5. INT/SEQ
014 R/  26   (26          ) 222232222222222222222      RACE/    INTACT: 2. BLACK    6. APPLIED
015 R/  27   (27          ) 222223222222222222222      RACE/    INTACT: 2. BLACK    7. OTHER
016 R/  28   (28          ) 222222322222222222222      RACE/    INTACT: 2. BLACK    8. MISSING
017 R/  31   (31          ) 222222211111112222222      RACE/    INTACT: 3. HISPANIC 1. NO MATH
018 R/  32   (32          ) 222222232222222222222      RACE/    INTACT: 3. HISPANIC 2. 8TH GRD
019 R/  33   (33          ) 222222223222222222222      RACE/    INTACT: 3. HISPANIC 3. PREALG
020 R/  34   (34          ) 222222222322222222222      RACE/    INTACT: 3. HISPANIC 4. ALGEBRA
021 R/  35   (35          ) 222222222232222222222      RACE/    INTACT: 3. HISPANIC 5. INT/SEQ
022 R/  36   (36          ) 222222222223222222222      RACE/    INTACT: 3. HISPANIC 6. APPLIED
023 R/  37   (37          ) 222222222222322222222      RACE/    INTACT: 3. HISPANIC 7. OTHER
024 R/  38   (38          ) 222222222222232222222      RACE/    INTACT: 3. HISPANIC 8. MISSING
025 R/  41   (41          ) 222222222222221111111      RACE/    INTACT: 4. ASIAN    1. NO MATH
026 R/  42   (42          ) 222222222222222322222      RACE/    INTACT: 4. ASIAN    2. 8TH GRD
027 R/  43   (43          ) 222222222222222232222      RACE/    INTACT: 4. ASIAN    3. PREALG
028 R/  44   (44          ) 222222222222222223222      RACE/    INTACT: 4. ASIAN    4. ALGEBRA
029 R/  45   (45          ) 222222222222222222322      RACE/    INTACT: 4. ASIAN    5. INT/SEQ
030 R/  46   (46          ) 222222222222222222232      RACE/    INTACT: 4. ASIAN    6. APPLIED
031 R/  47   (47          ) 222222222222222222223      RACE/    INTACT: 4. ASIAN    7. OTHER
032 R/  48   (48          ) 222222222222222223223      RACE/    INTACT: 4. ASIAN    8. MISSING

CONDITIONING VARIABLE ID: BACK0062
DESCRIPTION:              INTERACTION:  PARENTS' EDUCATION BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:       N08, S08
CONDITIONING VAR LABEL:   PARE/
NAEP ID:                  N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    40
TYPE OF CONTRAST:         INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        28

001 P/  11   (11          ) 3333333333333333333333333333  PARE/    INTACT: 1. < HS      1. NO MATH
002 P/  12   (12          ) 1222222122222212222221222222  PARE/    INTACT: 1. < HS      2. 8TH GRD
003 P/  13   (13          ) 2122222212222221222222122222  PARE/    INTACT: 1. < HS      3. PREALG
004 P/  14   (14          ) 2212222221222222122222212222  PARE/    INTACT: 1. < HS      4. ALGEBRA
005 P/  15   (15          ) 2221222222122222212222221222  PARE/    INTACT: 1. < HS      5. INT/SEQ
006 P/  16   (16          ) 2222122222212222221222222122  PARE/    INTACT: 1. < HS      6. APPLIED
007 P/  17   (17          ) 2222212222221222222122222212  PARE/    INTACT: 1. < HS      7. OTHER
008 P/  18   (18          ) 2222221222222122222212222221  PARE/    INTACT: 1. < HS      8. MISSING
009 P/  21   (21          ) 1111111222222222222222222222  PARE/    INTACT: 2. HS GRAD  1. NO MATH
010 P/  22   (22          ) 3222222222222222222222222222  PARE/    INTACT: 2. HS GRAD  2. 8TH GRD
011 P/  23   (23          ) 2322222222222222222222222222  PARE/    INTACT: 2. HS GRAD  3. PREALG
012 P/  24   (24          ) 2232222222222222222222222222  PARE/    INTACT: 2. HS GRAD  4. ALGEBRA
013 P/  25   (25          ) 2223222222222222222222222222  PARE/    INTACT: 2. HS GRAD  5. INT/SEQ
014 P/  26   (26          ) 2222322222222222222222222222  PARE/    INTACT: 2. HS GRAD  6. APPLIED
015 P/  27   (27          ) 2222232222222222222222222222  PARE/    INTACT: 2. HS GRAD  7. OTHER
016 P/  28   (28          ) 2222223222222222222222222222  PARE/    INTACT: 2. HS GRAD  8. MISSING
017 P/  31   (31          ) 2222222111111122222222222222  PARE/    INTACT: 3. POST HS  1. NO MATH
018 P/  32   (32          ) 2222222322222222222222222222  PARE/    INTACT: 3. POST HS  2. 8TH GRD
019 P/  33   (33          ) 2222222232222222222222222222  PARE/    INTACT: 3. POST HS  3. PREALG
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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020 P/  34   (34          ) 2222222223222222222222222222    PARE/    INTACT: 3. POST HS  4. ALGEBRA
021 P/  35   (35          ) 2222222222322222222222222222    PARE/    INTACT: 3. POST HS  5. INT/SEQ
022 P/  36   (36          ) 2222222222232222222222222222    PARE/    INTACT: 3. POST HS  6. APPLIED
023 P/  37   (37          ) 2222222222223222222222222222    PARE/    INTACT: 3. POST HS  7. OTHER
024 P/  38   (38          ) 2222222222222322222222222222    PARE/    INTACT: 3. POST HS  8. MISSING
025 P/  41   (41          ) 2222222222222211111112222222    PARE/    INTACT: 4. COL GRAD 1. NO MATH
026 P/  42   (42          ) 2222222222222232222222222222    PARE/    INTACT: 4. COL GRAD 2. 8TH GRD
027 P/  43   (43          ) 2222222222222223222222222222    PARE/    INTACT: 4. COL GRAD 3. PREALG
028 P/  44   (44          ) 2222222222222222322222222222    PARE/    INTACT: 4. COL GRAD 4. ALGEBRA
029 P/  45   (45          ) 2222222222222222232222222222    PARE/    INTACT: 4. COL GRAD 5. INT/SEQ
030 P/  46   (46          ) 2222222222222222223222222222    PARE/    INTACT: 4. COL GRAD 6. APPLIED
031 P/  47   (47          ) 2222222222222222222322222222    PARE/    INTACT: 4. COL GRAD 7. OTHER
032 P/  48   (48          ) 2222222222222222222232222222    PARE/    INTACT: 4. COL GRAD 8. MISSING
033 P/  51   (51          ) 2222222222222222222221111111    PARE/    INTACT: 5. PARED-?  1. NO MATH
034 P/  52   (52          ) 2222222222222222222223222222    PARE/    INTACT: 5. PARED-?  2. 8TH GRD
035 P/  53   (53          ) 2222222222222222222222322222    PARE/    INTACT: 5. PARED-?  3. PREALG
036 P/  54   (54          ) 2222222222222222222222232222    PARE/    INTACT: 5. PARED-?  4. ALGEBRA
037 P/  55   (55          ) 2222222222222222222222223222    PARE/    INTACT: 5. PARED-?  5. INT/SEQ
038 P/  56   (56          ) 2222222222222222222222222322    PARE/    INTACT: 5. PARED-?  6. APPLIED
039 P/  57   (57          ) 2222222222222222222222222232    PARE/    INTACT: 5. PARED-?  7. OTHER
040 P/  58   (58          ) 2222222222222222222222222223    PARE/    INTACT: 5. PARED-?  8. MISSING

CONDITIONING VARIABLE ID:   BACK0064
DESCRIPTION:                INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     TOL5/
NAEP ID:                    N/A                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    40
TYPE OF CONTRAST:           INTERACTION                         NUMBER OF INDEPENDENT CONTRASTS:        28

001 T/  11   (11          ) 3333333333333333333333333333    TOL5/    INTACT: 1. BIG CTY5 1. NO MATH
002 T/  12   (12          ) 1222222122222212222221222222    TOL5/    INTACT: 1. BIG CTY5 2. 8TH GRD
003 T/  13   (13          ) 2122222212222221222222122222    TOL5/    INTACT: 1. BIG CTY5 3. PREALG
004 T/  14   (14          ) 2212222221222222122222212222    TOL5/    INTACT: 1. BIG CTY5 4. ALGEBRA
005 T/  15   (15          ) 2221222222122222212222221222    TOL5/    INTACT: 1. BIG CTY5 5. INT/SEQ
006 T/  16   (16          ) 2222122222212222221222222122    TOL5/    INTACT: 1. BIG CTY5 6. APPLIED
007 T/  17   (17          ) 2222212222221222222122222212    TOL5/    INTACT: 1. BIG CTY5 7. OTHER
008 T/  18   (18          ) 2222221222222122222212222221    TOL5/    INTACT: 1. BIG CTY5 8. MISSING
009 T/  21   (21          ) 1111111222222222222222222222    TOL5/    INTACT: 2. MID CTY5 1. NO MATH
010 T/  22   (22          ) 3222222222222222222222222222    TOL5/    INTACT: 2. MID CTY5 2. 8TH GRD
011 T/  23   (23          ) 2322222222222222222222222222    TOL5/    INTACT: 2. MID CTY5 3. PREALG
012 T/  24   (24          ) 2232222222222222222222222222    TOL5/    INTACT: 2. MID CTY5 4. ALGEBRA
013 T/  25   (25          ) 2223222222222222222222222222    TOL5/    INTACT: 2. MID CTY5 5. INT/SEQ
014 T/  26   (26          ) 2222322222222222222222222222    TOL5/    INTACT: 2. MID CTY5 6. APPLIED
015 T/  27   (27          ) 2222232222222222222222222222    TOL5/    INTACT: 2. MID CTY5 7. OTHER
016 T/  28   (28          ) 2222223222222222222222222222    TOL5/    INTACT: 2. MID CTY5 8. MISSING
017 T/  31   (31          ) 2222222111111122222222222222    TOL5/    INTACT: 3. FR/BTWN5 1. NO MATH
018 T/  32   (32          ) 2222222322222222222222222222    TOL5/    INTACT: 3. FR/BTWN5 2. 8TH GRD
019 T/  33   (33          ) 2222222232222222222222222222    TOL5/    INTACT: 3. FR/BTWN5 3. PREALG
020 T/  34   (34          ) 2222222223222222222222222222    TOL5/    INTACT: 3. FR/BTWN5 4. ALGEBRA
021 T/  35   (35          ) 2222222222322222222222222222    TOL5/    INTACT: 3. FR/BTWN5 5. INT/SEQ
022 T/  36   (36          ) 2222222222232222222222222222    TOL5/    INTACT: 3. FR/BTWN5 6. APPLIED
023 T/  37   (37          ) 2222222222223222222222222222    TOL5/    INTACT: 3. FR/BTWN5 7. OTHER
024 T/  38   (38          ) 2222222222222322222222222222    TOL5/    INTACT: 3. FR/BTWN5 8. MISSING
025 T/  41   (41          ) 2222222222222211111112222222    TOL5/    INTACT: 4. SML TWN5 1. NO MATH
026 T/  42   (42          ) 2222222222222232222222222222    TOL5/    INTACT: 4. SML TWN5 2. 8TH GRD
027 T/  43   (43          ) 2222222222222223222222222222    TOL5/    INTACT: 4. SML TWN5 3. PREALG
028 T/  44   (44          ) 2222222222222222322222222222    TOL5/    INTACT: 4. SML TWN5 4. ALGEBRA
029 T/  45   (45          ) 2222222222222222232222222222    TOL5/    INTACT: 4. SML TWN5 5. INT/SEQ
030 T/  46   (46          ) 2222222222222222223222222222    TOL5/    INTACT: 4. SML TWN5 6. APPLIED
031 T/  47   (47          ) 2222222222222222222322222222    TOL5/    INTACT: 4. SML TWN5 7. OTHER
032 T/  48   (48          ) 2222222222222222222232222222    TOL5/    INTACT: 4. SML TWN5 8. MISSING
033 T/  51   (51          ) 2222222222222222222221111111    TOL5/    INTACT: 5. RURAL5   1. NO MATH
034 T/  52   (52          ) 2222222222222222222223222222    TOL5/    INTACT: 5. RURAL5   2. 8TH GRD
035 T/  53   (53          ) 2222222222222222222222322222    TOL5/    INTACT: 5. RURAL5   3. PREALG
036 T/  54   (54          ) 2222222222222222222222232222    TOL5/    INTACT: 5. RURAL5   4. ALGEBRA
037 T/  55   (55          ) 2222222222222222222222223222    TOL5/    INTACT: 5. RURAL5   5. INT/SEQ
038 T/  56   (56          ) 2222222222222222222222222322    TOL5/    INTACT: 5. RURAL5   6. APPLIED
039 T/  57   (57          ) 2222222222222222222222222232    TOL5/    INTACT: 5. RURAL5   7. OTHER
040 T/  58   (58          ) 2222222222222222222222222223    TOL5/    INTACT: 5. RURAL5   8. MISSING

CONDITIONING VARIABLE ID:   BACK0066
DESCRIPTION:                INTERACTION:  SCHOOL TYPE BY MATH COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     SCHT/
NAEP ID:                    N/A                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    24
TYPE OF CONTRAST:           INTERACTION                         NUMBER OF INDEPENDENT CONTRASTS:        14

001 S/  11   (11          ) 0101010101010101010101010101    SCHT/    INTACT: 1. PUBLIC   1. NO MATH
002 S/  12   (12          ) -1000000000000-1000000000000    SCHT/    INTACT: 1. PUBLIC   2. 8TH GRD
003 S/  13   (13          ) 00-1000000000000-10000000000    SCHT/    INTACT: 1. PUBLIC   3. PREALG
004 S/  14   (14          ) 0000-1000000000000-100000000    SCHT/    INTACT: 1. PUBLIC   4. ALGEBRA
005 S/  15   (15          ) 000000-1000000000000-1000000    SCHT/    INTACT: 1. PUBLIC   5. INT/SEQ
006 S/  16   (16          ) 00000000-1000000000000-10000    SCHT/    INTACT: 1. PUBLIC   6. APPLIED
007 S/  17   (17          ) 0000000000-1000000000000-100    SCHT/    INTACT: 1. PUBLIC   7. OTHER
008 S/  18   (18          ) 000000000000-1000000000000-1    SCHT/    INTACT: 1. PUBLIC   8. MISSING
009 S/  21   (21          ) -1-1-1-1-1-1-100000000000000    SCHT/    INTACT: 2. PRIVATE  1. NO MATH
010 S/  22   (22          ) 0100000000000000000000000000    SCHT/    INTACT: 2. PRIVATE  2. 8TH GRD
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
011 S/  23   (23         ) 0001000000000000000000000000    SCHT/   INTACT: 2. PRIVATE  3. PREALG
012 S/  24   (24         ) 0000010000000000000000000000    SCHT/   INTACT: 2. PRIVATE  4. ALGEBRA
013 S/  25   (25         ) 0000000100000000000000000000    SCHT/   INTACT: 2. PRIVATE  5. INT/SEQ
014 S/  26   (26         ) 0000000001000000000000000000    SCHT/   INTACT: 2. PRIVATE  6. APPLIED
015 S/  27   (27         ) 0000000000010000000000000000    SCHT/   INTACT: 2. PRIVATE  7. OTHER
016 S/  28   (28         ) 0000000000000100000000000000    SCHT/   INTACT: 2. PRIVATE  8. MISSING
017 S/  31   (31         ) 00000000000000-1-1-1-1-1-1-1    SCHT/   INTACT: 3. CATHOLIC 1. NO MATH
018 S/  32   (32         ) 0000000000000001000000000000    SCHT/   INTACT: 3. CATHOLIC 2. 8TH GRD
019 S/  33   (33         ) 0000000000000000010000000000    SCHT/   INTACT: 3. CATHOLIC 3. PREALG
020 S/  34   (34         ) 0000000000000000000100000000    SCHT/   INTACT: 3. CATHOLIC 4. ALGEBRA
021 S/  35   (35         ) 0000000000000000000001000000    SCHT/   INTACT: 3. CATHOLIC 5. INT/SEQ
022 S/  36   (36         ) 0000000000000000000000010000    SCHT/   INTACT: 3. CATHOLIC 6. APPLIED
023 S/  37   (37         ) 0000000000000000000000000100    SCHT/   INTACT: 3. CATHOLIC 7. OTHER
024 S/  38   (38         ) 0000000000000000000000000001    SCHT/   INTACT: 3. CATHOLIC 8. MISSING

CONDITIONING VARIABLE ID:  BACK0059
DESCRIPTION:               INTERACTION:  GENDER BY NUMBER OF SEMESTERS MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    GEND/SEM
NAEP ID:                   N/A                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    10
TYPE OF CONTRAST:          INTERACTION               NUMBER OF INDEPENDENT CONTRASTS:         4

001 G/S 11   (11         ) 01010101                  GEND/SEM INTACT: 1. MALE     1. SEMMAT01
002 G/S 12   (12         ) -1000000                  GEND/SEM INTACT: 1. MALE     2. SEMMAT02
003 G/S 13   (13         ) 00-10000                  GEND/SEM INTACT: 1. MALE     3. SEMMAT03
004 G/S 14   (14         ) 0000-100                  GEND/SEM INTACT: 1. MALE     4. SEMMAT04
005 G/S 15   (15         ) 0000-100                  GEND/SEM INTACT: 1. MALE     5. SEMMAT-?
006 G/S 21   (21         ) -1-1-1-1                  GEND/SEM INTACT: 2. FEMALE   1. SEMMAT01
007 G/S 22   (22         ) 01000000                  GEND/SEM INTACT: 2. FEMALE   2. SEMMAT02
008 G/S 23   (23         ) 00010000                  GEND/SEM INTACT: 2. FEMALE   3. SEMMAT03
009 G/S 24   (24         ) 00000100                  GEND/SEM INTACT: 2. FEMALE   4. SEMMAT04
010 G/S 25   (25         ) 00000001                  GEND/SEM INTACT: 2. FEMALE   5. SEMMAT-?

CONDITIONING VARIABLE ID:  BACK0061
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY NUMBER OF SEMESTERS MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    RACE/SEM
NAEP ID:                   N/A                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    20
TYPE OF CONTRAST:          INTERACTION               NUMBER OF INDEPENDENT CONTRASTS:        12

001 R/S 11   (11         ) 010101010101010101010101  RACE/SEM INTACT: 1. WHI/AI/O 1. SEMMAT01
002 R/S 12   (12         ) -1000000-1000000-1000000  RACE/SEM INTACT: 1. WHI/AI/O 2. SEMMAT02
003 R/S 13   (13         ) 00-1000000-1000000-10000  RACE/SEM INTACT: 1. WHI/AI/O 3. SEMMAT03
004 R/S 14   (14         ) 0000-1000000-1000000-100  RACE/SEM INTACT: 1. WHI/AI/O 4. SEMMAT04
005 R/S 15   (15         ) 000000-1000000-1000000-1  RACE/SEM INTACT: 1. WHI/AI/O 5. SEMMAT-?
006 R/S 21   (21         ) -1-1-1-10000000000000000  RACE/SEM INTACT: 2. BLACK    1. SEMMAT01
007 R/S 22   (22         ) 010000000000000000000000  RACE/SEM INTACT: 2. BLACK    2. SEMMAT02
008 R/S 23   (23         ) 000100000000000000000000  RACE/SEM INTACT: 2. BLACK    3. SEMMAT03
009 R/S 24   (24         ) 000001000000000000000000  RACE/SEM INTACT: 2. BLACK    4. SEMMAT04
010 R/S 25   (25         ) 000000010000000000000000  RACE/SEM INTACT: 2. BLACK    5. SEMMAT-?
011 R/S 31   (31         ) 00000000-1-1-1-100000000  RACE/SEM INTACT: 3. HISPANIC 1. SEMMAT01
012 R/S 32   (32         ) 000000000100000000000000  RACE/SEM INTACT: 3. HISPANIC 2. SEMMAT02
013 R/S 33   (33         ) 000000000001000000000000  RACE/SEM INTACT: 3. HISPANIC 3. SEMMAT03
014 R/S 34   (34         ) 000000000000010000000000  RACE/SEM INTACT: 3. HISPANIC 4. SEMMAT04
015 R/S 35   (35         ) 000000000000000100000000  RACE/SEM INTACT: 3. HISPANIC 5. SEMMAT-?
016 R/S 41   (41         ) 0000000000000000-1-1-1-1  RACE/SEM INTACT: 4. ASIAN    1. SEMMAT01
017 R/S 42   (42         ) 000000000000000001000000  RACE/SEM INTACT: 4. ASIAN    2. SEMMAT02
018 R/S 43   (43         ) 000000000000000000010000  RACE/SEM INTACT: 4. ASIAN    3. SEMMAT03
019 R/S 44   (44         ) 000000000000000000000100  RACE/SEM INTACT: 4. ASIAN    4. SEMMAT04
020 R/S 45   (45         ) 000000000000000000000001  RACE/SEM INTACT: 4. ASIAN    5. SEMMAT-?

CONDITIONING VARIABLE ID:  BACK0063
DESCRIPTION:               INTERACTION:  PARENTS' EDUCATION BY NUMBER OF SEMESTERS MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    PARE/SEM
NAEP ID:                   N/A                       TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
TYPE OF CONTRAST:          INTERACTION               NUMBER OF INDEPENDENT CONTRASTS:        16

001 P/S 11   (11         ) 01010101010101010101010101010101 PARE/SEM INTACT: 1. < HS     1. SEMMAT01
002 P/S 12   (12         ) -1000000-1000000-1000000-1000000 PARE/SEM INTACT: 1. < HS     2. SEMMAT02
003 P/S 13   (13         ) 00-1000000-1000000-1000000-10000 PARE/SEM INTACT: 1. < HS     3. SEMMAT03
004 P/S 14   (14         ) 0000-1000000-1000000-1000000-100 PARE/SEM INTACT: 1. < HS     4. SEMMAT04
005 P/S 15   (15         ) 000000-1000000-1000000-1000000-1 PARE/SEM INTACT: 1. < HS     5. SEMMAT-?
006 P/S 21   (21         ) -1-1-1-1000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  1. SEMMAT01
007 P/S 22   (22         ) 01000000000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  2. SEMMAT02
008 P/S 23   (23         ) 00010000000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  3. SEMMAT03
009 P/S 24   (24         ) 00000100000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  4. SEMMAT04
010 P/S 25   (25         ) 00000001000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  5. SEMMAT-?
011 P/S 31   (31         ) 00000000-1-1-1-10000000000000000 PARE/SEM INTACT: 3. POST HS  1. SEMMAT01
012 P/S 32   (32         ) 00000000010000000000000000000000 PARE/SEM INTACT: 3. POST HS  2. SEMMAT02
013 P/S 33   (33         ) 00000000000100000000000000000000 PARE/SEM INTACT: 3. POST HS  3. SEMMAT03
014 P/S 34   (34         ) 00000000000001000000000000000000 PARE/SEM INTACT: 3. POST HS  4. SEMMAT04
015 P/S 35   (35         ) 00000000000000010000000000000000 PARE/SEM INTACT: 3. POST HS  5. SEMMAT-?
016 P/S 41   (41         ) 0000000000000000-1-1-1-100000000 PARE/SEM INTACT: 4. COL GRAD 1. SEMMAT01
017 P/S 42   (42         ) 00000000000000000100000000000000 PARE/SEM INTACT: 4. COL GRAD 2. SEMMAT02
018 P/S 43   (43         ) 00000000000000000001000000000000 PARE/SEM INTACT: 4. COL GRAD 3. SEMMAT03
019 P/S 44   (44         ) 00000000000000000000010000000000 PARE/SEM INTACT: 4. COL GRAD 4. SEMMAT04
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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020 P/S 45   (45           ) 00000000000000000000000100000000 PARE/SEM INTACT: 4. COL GRAD 5. SEMMAT-?
021 P/S 51   (51           ) 000000000000000000000000-1-1-1-1 PARE/SEM INTACT: 5. PARED-?  1. SEMMAT01
022 P/S 52   (52           ) 00000000000000000000000001000000 PARE/SEM INTACT: 5. PARED-?  2. SEMMAT02
023 P/S 53   (53           ) 00000000000000000000000000010000 PARE/SEM INTACT: 5. PARED-?  3. SEMMAT03
024 P/S 54   (54           ) 00000000000000000000000000000100 PARE/SEM INTACT: 5. PARED-?  4. SEMMAT04
025 P/S 55   (55           ) 00000000000000000000000000000001 PARE/SEM INTACT: 5. PARED-?  5. SEMMAT-?

CONDITIONING VARIABLE ID:  BACK0065
DESCRIPTION:               INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY NUMBER OF SEMESTERS MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    TOL5/SEM
NAEP ID:                   N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
TYPE OF CONTRAST:          INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:        16

001 T/S 11   (11           ) 01010101010101010101010101010101 TOL5/SEM INTACT: 1. BIG CTY5 1. SEMMAT01
002 T/S 12   (12           ) -1000000-1000000-1000000-1000000 TOL5/SEM INTACT: 1. BIG CTY5 2. SEMMAT02
003 T/S 13   (13           ) 00-1000000-1000000-1000000-10000 TOL5/SEM INTACT: 1. BIG CTY5 3. SEMMAT03
004 T/S 14   (14           ) 0000-1000000-1000000-1000000-100 TOL5/SEM INTACT: 1. BIG CTY5 4. SEMMAT04
005 T/S 15   (15           ) 000000-1000000-1000000-1000000-1 TOL5/SEM INTACT: 1. BIG CTY5 5. SEMMAT-?
006 T/S 21   (21           ) -1-1-1-1000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 1. SEMMAT01
007 T/S 22   (22           ) 01000000000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 2. SEMMAT02
008 T/S 23   (23           ) 00010000000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 3. SEMMAT03
009 T/S 24   (24           ) 00000100000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 4. SEMMAT04
010 T/S 25   (25           ) 00000001000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 5. SEMMAT-?
011 T/S 31   (31           ) 00000000-1-1-1-10000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 1. SEMMAT01
012 T/S 32   (32           ) 00000000010000000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 2. SEMMAT02
013 T/S 33   (33           ) 00000000000100000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 3. SEMMAT03
014 T/S 34   (34           ) 00000000000001000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 4. SEMMAT04
015 T/S 35   (35           ) 00000000000000010000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 5. SEMMAT-?
016 T/S 41   (41           ) 0000000000000000-1-1-1-100000000 TOL5/SEM INTACT: 4. SML TWN5 1. SEMMAT01
017 T/S 42   (42           ) 00000000000000000100000000000000 TOL5/SEM INTACT: 4. SML TWN5 2. SEMMAT02
018 T/S 43   (43           ) 00000000000000000001000000000000 TOL5/SEM INTACT: 4. SML TWN5 3. SEMMAT03
019 T/S 44   (44           ) 00000000000000000000010000000000 TOL5/SEM INTACT: 4. SML TWN5 4. SEMMAT04
020 T/S 45   (45           ) 00000000000000000000000100000000 TOL5/SEM INTACT: 4. SML TWN5 5. SEMMAT-?
021 T/S 51   (51           ) 000000000000000000000000-1-1-1-1 TOL5/SEM INTACT: 5. RURAL5   1. SEMMAT01
022 T/S 52   (52           ) 00000000000000000000000001000000 TOL5/SEM INTACT: 5. RURAL5   2. SEMMAT02
023 T/S 53   (53           ) 00000000000000000000000000010000 TOL5/SEM INTACT: 5. RURAL5   3. SEMMAT03
024 T/S 54   (54           ) 00000000000000000000000000000100 TOL5/SEM INTACT: 5. RURAL5   4. SEMMAT04
025 T/S 55   (55           ) 00000000000000000000000000000001 TOL5/SEM INTACT: 5. RURAL5   5. SEMMAT-?

CONDITIONING VARIABLE ID:  BACK0067
DESCRIPTION:               INTERACTION:  SCHOOL TYPE BY NUMBER OF SEMESTERS MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SCHT/SEM
NAEP ID:                   N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
TYPE OF CONTRAST:          INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:         8

001 S/S 11   (11           ) 0101010101010101                 SCHT/SEM INTACT: 1. PUBLIC   1. SEMMAT01
002 S/S 12   (12           ) -1000000-1000000                 SCHT/SEM INTACT: 1. PUBLIC   2. SEMMAT02
003 S/S 13   (13           ) 00-1000000-10000                 SCHT/SEM INTACT: 1. PUBLIC   3. SEMMAT03
004 S/S 14   (14           ) 0000-1000000-100                 SCHT/SEM INTACT: 1. PUBLIC   4. SEMMAT04
005 S/S 15   (15           ) 000000-1000000-1                 SCHT/SEM INTACT: 1. PUBLIC   5. SEMMAT-?
006 S/S 21   (21           ) -1-1-1-100000000                 SCHT/SEM INTACT: 2. PRIVATE  1. SEMMAT01
007 S/S 22   (22           ) 0100000000000000                 SCHT/SEM INTACT: 2. PRIVATE  2. SEMMAT02
008 S/S 23   (23           ) 0001000000000000                 SCHT/SEM INTACT: 2. PRIVATE  3. SEMMAT03
009 S/S 24   (24           ) 0000010000000000                 SCHT/SEM INTACT: 2. PRIVATE  4. SEMMAT04
010 S/S 25   (25           ) 0000000100000000                 SCHT/SEM INTACT: 2. PRIVATE  5. SEMMAT-?
011 S/S 31   (31           ) 00000000-1-1-1-1                 SCHT/SEM INTACT: 3. CATHOLIC 1. SEMMAT01
012 S/S 32   (32           ) 0000000001000000                 SCHT/SEM INTACT: 3. CATHOLIC 2. SEMMAT02
013 S/S 33   (33           ) 0000000000010000                 SCHT/SEM INTACT: 3. CATHOLIC 3. SEMMAT03
014 S/S 34   (34           ) 0000000000000100                 SCHT/SEM INTACT: 3. CATHOLIC 4. SEMMAT04
015 S/S 35   (35           ) 0000000000000001                 SCHT/SEM INTACT: 3. CATHOLIC 5. SEMMAT-?

CONDITIONING VARIABLE ID:  BACK0071
DESCRIPTION:               SAMPLE TYPE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   SUBSAMP                            TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:          CLASS                              NUMBER OF INDEPENDENT CONTRASTS:         2

001 SAMP S1  (01           ) 00                               SAMPLE S1
002 SAMP S2  (02           ) 10                               SAMPLE S2
003 SAMP S3  (03           ) 01                               SAMPLE S3

CONDITIONING VARIABLE ID:  BACK0072
DESCRIPTION:               INTERACTION:  SAMPLE BY RACE/ETHNICITY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:        /RAC
NAEP ID:                   N/A                                TOTAL NUMBER OF SPECIFIED CONTRASTS:    12
TYPE OF CONTRAST:          INTERACTION                        NUMBER OF INDEPENDENT CONTRASTS:         6

001   /R 11  (11           ) 010101010101                         /RAC INTACT: 1. SAMP S1  1. WHI/AI/O
002   /R 12  (12           ) -10000-10000                         /RAC INTACT: 1. SAMP S1  2. BLACK
003   /R 13  (13           ) 00-10000-100                         /RAC INTACT: 1. SAMP S1  3. HISPANIC
004   /R 14  (14           ) 0000-10000-1                         /RAC INTACT: 1. SAMP S1  4. ASIAN
005   /R 21  (21           ) -1-1-1000000                         /RAC INTACT: 2. SAMP S2  1. WHI/AI/O
006   /R 22  (22           ) 010000000000                         /RAC INTACT: 2. SAMP S2  2. BLACK
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
007  /R 23   (23          ) 000100000000          /RAC INTACT: 2. SAMP S2  3. HISPANIC
008  /R 24   (24          ) 000001000000          /RAC INTACT: 2. SAMP S2  4. ASIAN
009  /R 31   (31          ) 000000-1-1-1          /RAC INTACT: 3. SAMP S3  1. WHI/AI/O
010  /R 32   (32          ) 000000010000          /RAC INTACT: 3. SAMP S3  2. BLACK
011  /R 33   (33          ) 000000000100          /RAC INTACT: 3. SAMP S3  3. HISPANIC
012  /R 34   (34          ) 000000000001          /RAC INTACT: 3. SAMP S3  4. ASIAN

CONDITIONING VARIABLE ID:  BACK0073
DESCRIPTION:               REPORTING SAMPLE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   RPTSAMP                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 RPTSAMP  (01         ) 0                          YES
002 RPT NO   (02         ) 1                          NO

CONDITIONING VARIABLE ID:  BACK0074
DESCRIPTION:               HOW OFTEN USE A HOME COMPUTER FOR SCHOOLWORK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   B009301                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       5

001 B009301A (01         ) 00000                      ALMOST EVERY DAY
002 B009301B (02         ) 10000                      ONCE OR TWICE A WEEK
003 B009301C (03         ) 01000                      ONCE OR TWICE A MTH
004 B009301D (04         ) 00100                      NEVER OR HARDLY EVER
005 B009301E (05         ) 00010                      NO COMPUTER AT HOME
006 B009301M (M          ) 00001                      MISSING

CONDITIONING VARIABLE ID:  BACK0075
DESCRIPTION:               HOW SAFE DO YOU FEEL AT SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   B009401                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 B009401A (01         ) 0000                       VERY SAFE
002 B009401B (02         ) 1000                       SOMEWHAT SAFE
003 B009401C (03         ) 0100                       SOMEWHAT UNSAFE
004 B009401D (04         ) 0010                       VERY UNSAFERDLY EVER
005 B009401M (M          ) 0001                       MISSING

CONDITIONING VARIABLE ID:  BACK0076
DESCRIPTION:               DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   B009501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 B009501A (01         ) 000                        YES
002 B009501B (02         ) 100                        NO
003 B009501C (03         ) 010                        DON'T LIVE W/ MOTHER
004 B009501M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  BACK0077
DESCRIPTION:               DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   B009502                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 B009502A (01         ) 000                        YES
002 B009502B (02         ) 100                        NO
003 B009502C (03         ) 010                        DON'T LIVE W/ FATHER
004 B009502M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  SUBJ0002
DESCRIPTION:               HOW OFTEN DO YOU DO MATH PROBLEMS FROM TEXTBOOK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812701                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812701A (01         ) 0000                       ALMOST EVERY DAY
002 M812701B (02         ) 1000                       ONCE OR TWICE A WEEK
003 M812701C (03         ) 0100                       ONCE OR TWICE MONTH
004 M812701D (04         ) 0010                       NEVER OR HARDLY EVER
005 M812701M (M          ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SUBJ0003
DESCRIPTION:               HOW OFTEN DO YOU DO MATH PROBLEMS ON WORK SHEETS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812702                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 M812702A (01          ) 0000                     ALMOST EVERY DAY
002 M812702B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812702C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812701D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812701M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0004
DESCRIPTION:               HOW OFTEN SOLVE MATH PROBLEMS WITH PARTNER/GROUP?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812703                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812703A (01          ) 0000                     ALMOST EVERY DAY
002 M812703B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812703C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812703D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812703M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0005
DESCRIPTION:               HOW OFTEN IN MATH WORK W/ RULERS, GEOM SHAPES?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   M812704                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812704A (01          ) 0000                     ALMOST EVERY DAY
002 M812704B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812704C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812704D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812704M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0006
DESCRIPTION:               HOW OFTEN WRITE ABOUT SOLVING A MATH PROBLEM?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812705                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812705A (01          ) 0000                     ALMOST EVERY DAY
002 M812705B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812705C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812705D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812705M (M           ) 0001                     MISSING    RDLY EVER

CONDITIONING VARIABLE ID:  SUBJ0007
DESCRIPTION:               HOW OFTEN DO YOU TAKE MATHEMATICS TESTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812706                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812706A (01          ) 0000                     ALMOST EVERY DAY
002 M812706B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812706C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812706D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812706M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0008
DESCRIPTION:               HOW OFTEN DO YOU TALK TO THE CLASS RE MATH WORK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812707                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812707A (01          ) 0000                     ALMOST EVERY DAY
002 M812707B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812707C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812707D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812707M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0009
DESCRIPTION:               HOW OFTEN DO 10 OR MORE MATH PROBLEMS BY YOURSELF?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812708                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812708A (01          ) 0000                     ALMOST EVERY DAY
002 M812708B (02          ) 1000                     ONCE OR TWICE A WEEK
003 M812708C (03          ) 0100                     ONCE OR TWICE MONTH
004 M812708D (04          ) 0010                     NEVER OR HARDLY EVER
005 M812708M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0010
DESCRIPTION:               HOW OFTEN DISCUSS MATH PROBLEMS W/ OTHER STUDENTS?
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812709                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812709A (01           ) 0000                       ALMOST EVERY DAY
002 M812709B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812709C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812709D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812709M (M            ) 0001                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0011
DESCRIPTION:                 HOW OFTEN DO YOU USE A COMPUTER FOR MATH?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812710                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812710A (01           ) 0000                       ALMOST EVERY DAY
002 M812710B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812710C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812710D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812710M (M            ) 0001                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0012
DESCRIPTION:                 HOW OFTEN DO YOU USE A CALCULATOR FOR MATH?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812711                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812711A (01           ) 0000                       ALMOST EVERY DAY
002 M812711B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812711C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812711D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812711M (M            ) 0001                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0013
DESCRIPTION:                 DO YOU HAVE CALCULATOR TO USE WITH MATH HOMEWORK?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M811201                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       2

001 M811201Y (01           ) 00                         YES
002 M811201N (02           ) 10                         NODECIDED
003 M811201M (M            ) 01                         MISSING

CONDITIONING VARIABLE ID:    SUBJ0014
DESCRIPTION:                 HOW OFTEN USE A CALCULATOR FOR MATH CLASSWORK?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812001                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812001A (01           ) 0000                       ALMOST EVERY DAY
002 M812001B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812001C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812001D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812001M (M            ) 0001                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0015
DESCRIPTION:                 HOW OFTEN USE A CALCULATOR FOR MATH HOMEWORK?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812002                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812002A (01           ) 0000                       ALMOST EVERY DAY
002 M812002B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812001C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812001D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812001M (M            ) 0001                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0016
DESCRIPTION:                 HOW OFTEN USE A CALCULATOR FOR MATH TESTS/QUIZZES?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     M812003                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       4

001 M812003A (01           ) 0000                       ALMOST EVERY DAY
002 M812003B (02           ) 1000                       ONCE OR TWICE A WEEK
003 M812003C (03           ) 0100                       ONCE OR TWICE MONTH
004 M812003D (04           ) 0010                       NEVER OR HARDLY EVER
005 M812003M (M            ) 0001                       MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   SUBJ0017
DESCRIPTION:                HOW MUCH TIME SPEND DAILY ON MATH HOMEWORK?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 M812101A (01          ) 0000000                  NOT TAKING THIS YEAR
002 M812101B (02          ) 1000000                  NONE
003 M812101C (03          ) 0100000                  15 MINUTES
004 M812101D (04          ) 0010000                  30 MINUTES
005 M812101E (05          ) 0001000                  45 MINUTES
006 M812101F (06          ) 0000100                  ONE HOUR
007 M812101G (07          ) 0000010                  MORE THAN ONE HOUR
008 M812101M (M           ) 0000001                  MISSING

CONDITIONING VARIABLE ID:   SUBJ0018
DESCRIPTION:                GET MATH HELP FROM SPECIAL TEACHER/AIDE/TUTOR?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811401                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 M811401Y (01          ) 00                       YES
002 M811401N (02          ) 10                       NODECIDED
003 M811401M (M           ) 01                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0019
DESCRIPTION:                AGREE/DISAGREE: I LIKE MATH
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811101A (01          ) 000                      AGREE
002 M811101B (02          ) 100                      UNDECIDED
003 M811101C (03          ) 010                      DISAGREE OR LESS
004 M811101M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0020
DESCRIPTION:                AGREE/DISAGREE: I AM GOOD AT MATH
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811103                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811103A (01          ) 000                      AGREE
002 M811103B (02          ) 100                      UNDECIDED
003 M811103C (03          ) 010                      DISAGREE OR LESS
004 M811103M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0021
DESCRIPTION:                HOW MUCH AGREE-UNDERSTAND MOST OF MATH CLASS?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811106                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811106A (01          ) 000                      AGREE
002 M811106B (02          ) 100                      UNDECIDED
003 M811106C (03          ) 010                      DISAGREE OR LESS
004 M811106M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0022
DESCRIPTION:                HOW MUCH AGREE-ONLY 1 CORRECT WAY TO SOLVE PROB?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811109                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811109A (01          ) 000                      AGREE
002 M811109B (02          ) 100                      UNDECIDED
003 M811109C (03          ) 010                      DISAGREE OR LESS
004 M811109M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0023
DESCRIPTION:                HOW MUCH AGREE-LEARNING MATH IS MEMORIZING FACTS?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811107                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811107A (01          ) 000                      AGREE
002 M811107B (02          ) 100                      UNDECIDED
003 M811107C (03          ) 010                      DISAGREE OR LESS
004 M811107M (M           ) 001                      MISSING
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   SUBJ0024
DESCRIPTION:                AGREE/DISAGREE: MATH USED FOR SOLVING PROBLEMS
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811105
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811105A (01          ) 000                    AGREE
002 M811105B (02          ) 100                    UNDECIDED
003 M811105C (03          ) 010                    DISAGREE OR LESS
004 M811105M (M           ) 001                    MISSING

CONDITIONING VARIABLE ID:   SUBJ0025
DESCRIPTION:                HOW MUCH AGREE-IF CHOICE I WOULDN'T STUDY MORE?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811108
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811108A (01          ) 000                    AGREE
002 M811108B (02          ) 100                    UNDECIDED
003 M811108C (03          ) 010                    DISAGREE OR LESS
004 M811108M (M           ) 001                    MISSING

CONDITIONING VARIABLE ID:   SUBJ0026
DESCRIPTION:                HOW MUCH AGREE-EVERYONE CAN DO WELL IF TRY?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    M811110
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 M811110A (01          ) 000                    AGREE
002 M811110B (02          ) 100                    UNDECIDED
003 M811110C (03          ) 010                    DISAGREE OR LESS
004 M811110M (M           ) 001                    MISSING

CONDITIONING VARIABLE ID:   SUBJ0027
DESCRIPTION:                ABOUT HOW MANY QUESTIONS RIGHT ON TEST?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    MM00101
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00101A (01          ) 0000                   ALMOST ALL
002 MM00101B (02          ) 1000                   MORE THAN HALF
003 MM00101C (03          ) 0100                   ABOUT HALF
004 MM00101D (04          ) 0010                   LESS THAN HALF
005 MM00101M (M           ) 0001                   MISSING

CONDITIONING VARIABLE ID:   SUBJ0028
DESCRIPTION:                HOW HARD TEST COMPARED TO THOSE IN SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    MM00201
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00201A (01          ) 0000                   MUCH HARDER
002 MM00201B (02          ) 1000                   HARDER THAN OTHERS
003 MM00201C (03          ) 0100                   ABOUT THE SAME
004 MM00201D (04          ) 0010                   EASIER THEN OTHES
005 MM00201M (M           ) 0001                   MISSING

CONDITIONING VARIABLE ID:   SUBJ0029
DESCRIPTION:                HOW HARD DID YOU TRY ON TEST COMPARED TO OTHERS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    MM00301
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00301A (01          ) 0000                   MUCH HARDER
002 MM00301B (02          ) 1000                   HARDER THAN OTHERS
003 MM00301C (03          ) 0100                   ABOUT AS HARD
004 MM00301D (04          ) 0010                   NOT AS HARD AS OTHER
005 MM00301M (M           ) 0001                   MISSING

CONDITIONING VARIABLE ID:   SUBJ0030
DESCRIPTION:                HOW IMPORTANT WAS IT YOU DO WELL ON THIS TEST?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    MM00401
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00401A (01          ) 0000                   VERY IMPORTANT
002 MM00401B (02          ) 1000                   IMPORTANT
003 MM00401C (03          ) 0100                   SOMEWHAT IMPORTANT
004 MM00401D (04          ) 0010                   NOT VERY IMPORTANTER
005 MM00401M (M           ) 0001                   MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   SUBJ0031
DESCRIPTION:                HOW OFTEN HAD TO WRITE LONG ANSWERS TO QSTS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    MM00501                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 MM00501A (01          ) 0000                            AT LEAST ONCE A WEEK
002 MM00501B (02          ) 1000                            ONCE OR TWICE A MNTH
003 MM00501C (03          ) 0100                            ONCE OR TWICE A YEAR
004 MM00501D (04          ) 0010                            NEVERERY IMPORTANTER
005 MM00501M (M           ) 0001                            MISSING

CONDITIONING VARIABLE ID:   BACK0078
DESCRIPTION:                DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    B009701                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        6

001 B009701A (01          ) 000000                          MOSTLY A'S
002 B009701B (02          ) 100000                          MOSTLY B'S
003 B009701C (03          ) 010000                          MOSTLY C'S
004 B009701D (04          ) 001000                          MOSTLY D'S
005 B009701E (05          ) 000100                          MOSTLY BELOW D'S
006 B009701F (06          ) 000010                          CLASSES NOT GRADED
007 B009701M (M           ) 000001                          MISSING

CONDITIONING VARIABLE ID:   BACK0079
DESCRIPTION:                HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    B009801                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        6

001 NO HS    (01          ) 000000                          NOT FINISH HS
002 GRAD HS  (02          ) 100000                          GRADUATE HS
003 ED > HS  (03          ) 010000                          SOME ED PAST HS
004 GRAD CLG (04          ) 001000                          GRADUATE COLLEGE
005 GRAD SCH (05          ) 000100                          GO GRADUATE SCHOOL
006 IDK      (06          ) 000010                          I DON'T KNOWGRADED
007 MISSING  (M           ) 000001                          MISSING

CONDITIONING VARIABLE ID:   BACK0080
DESCRIPTION:                DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    B009601                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 B009601A (01          ) 0000                            YES, FULL-TIME
002 B009601B (02          ) 1000                            YES, PART-TIME
003 B009601C (03          ) 0100                            NO
004 B009601D (04          ) 0010                            DON'T LIVE W/ MOTHER
005 B009601M (M           ) 0001                            MISSING

CONDITIONING VARIABLE ID:   BACK0081
DESCRIPTION:                DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    B009602                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 B009601A (01          ) 0000                            YES, FULL-TIME
002 B009601B (02          ) 1000                            YES, PART-TIME
003 B009601C (03          ) 0100                            NO
004 B009601D (04          ) 0010                            DON'T LIVE W/ FATHER
005 B009601M (M           ) 0001                            MISSING

CONDITIONING VARIABLE ID:   SUBJ0032
DESCRIPTION:                WORK W/ MEAS. INSTRUMENTS/GEOM SOLIDS FOR MATH?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    M812712                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 M812712A (01          ) 0000                            ALMOST EVERY DAY
002 M812712B (02          ) 1000                            ONCE OR TWICE A WEEK
003 M812712C (03          ) 0100                            ONCE OR TWICE MONTH
004 M812712D (04          ) 0010                            NEVER OR HARDLY EVER
005 M812712M (M           ) 0001                            MISSING

CONDITIONING VARIABLE ID:   SUBJ0033
DESCRIPTION:                HOW OFTEN WRITE REPORTS OR DO MATH PROJECTS?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
NAEP ID:                        M812713
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                               NUMBER OF INDEPENDENT CONTRASTS:        4
001 M812713A (01              ) 0000
002 M812713B (02              ) 1000                           ALMOST EVERY DAY
003 M812713C (03              ) 0100                           ONCE OR TWICE A WEEK
004 M812713D (04              ) 0010                           ONCE OR TWICE MONTH
005 M812713M (M               ) 0001                           NEVER OR HARDLY EVER
                                                               MISSING    RDLY EVER

CONDITIONING VARIABLE ID:       SUBJ0034
DESCRIPTION:                    IS THERE A PORTFOLIO W/ YOUR MATH WORK IN IT?
GRADES/ASSESSMENTS:             N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                        M812201
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                               NUMBER OF INDEPENDENT CONTRASTS:        2
001 M812201Y (01              ) 00
002 M812201N (02              ) 10                             YES
003 M812201M (M               ) 01                             NONE
                                                               MISSING

CONDITIONING VARIABLE ID:       SUBJ0035
DESCRIPTION:                    DO YOU USE A SCIENTIFIC CALCULATOR FOR MATH WORK?
GRADES/ASSESSMENTS:             N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                        M812301
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                               NUMBER OF INDEPENDENT CONTRASTS:        2
001 M812301Y (01              ) 00
002 M812301N (02              ) 10                             YES
003 M812301M (M               ) 01                             NONE
                                                               MISSING

CONDITIONING VARIABLE ID:       SUBJ0036
DESCRIPTION:                    DO YOU USE A GRAPHING CALCULATOR FOR MATH WORK?
GRADES/ASSESSMENTS:             N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                        M812401
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                               NUMBER OF INDEPENDENT CONTRASTS:        2
001 M812401Y (01              ) 00
002 M812401N (02              ) 10                             YES
003 M812401M (M               ) 01                             NONE
                                                               MISSING

CONDITIONING VARIABLE ID:       SUBJ0037
DESCRIPTION:                    WHAT KIND OF MATH CLASS WILL YOU TAKE IN 9TH GR?
GRADES/ASSESSMENTS:             N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                        MATEXP
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:   10
                                                               NUMBER OF INDEPENDENT CONTRASTS:        9
001 NO MATH  (01              ) 000000000
002 BASIC    (02              ) 100000000                      NOT EXPECT TO TAKE
003 APPLIED  (03              ) 010000000                      BASIC,GEN,BUSINESS
004 PREALG   (04              ) 001000000                      APPLIED MATH
005 ALG 1    (05              ) 000100000                      PREALGEBRA
006 GEOMETRY (06              ) 000010000                      ALGEBRA 1/ELEM ALG
007 INT/SEQ  (07              ) 000001000                      GEOMETRY
008 OTHER    (08              ) 000000100                      INTERGATED/SEQUENTAL
009 IDK      (09              ) 000000010                      OTHER MATH CLASS
010 MISSING  (M               ) 000000001                      I DON'T KNOW
                                                               MISSING    W

CONDITIONING VARIABLE ID:       SUBJ0038
DESCRIPTION:                    DO YOU AGREE: I LIKE MATH
GRADES/ASSESSMENTS:             N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                        M810701
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                               NUMBER OF INDEPENDENT CONTRASTS:        5
001 M812701A (01              ) 00000
002 M812701B (02              ) 10000                          STRONGLY AGREE
003 M812701C (03              ) 01000                          AGREE
004 M812701D (04              ) 00100                          UNDECIDED
005 M812701E (05              ) 00010                          DISAGREE
006 M812701M (M               ) 00001                          STRONGLY DISAGREE
                                                               MISSING

CONDITIONING VARIABLE ID:       SUBJ0039
DESCRIPTION:                    DO YOU AGREE: I AM GOOD IN MATH
GRADES/ASSESSMENTS:             N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                        M810703
TYPE OF CONTRAST:               CLASS                          TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                               NUMBER OF INDEPENDENT CONTRASTS:        5
001 M810701A (01              ) 00000
002 M810701B (02              ) 10000                          STRONGLY AGREE
003 M810701C (03              ) 01000                          AGREE
004 M810701D (04              ) 00100                          UNDECIDED
005 M810701E (05              ) 00010                          DISAGREE
006 M810701M (M               ) 00001                          STRONGLY DISAGREE
                                                               MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  SUBJ0040
DESCRIPTION:               AGREE/DISAGREE: UNDERSTAND MOST OF MATH CLASS
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810707                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810707A (01         ) 00000                   STRONGLY AGREE
002 M810707B (02         ) 10000                   AGREE
003 M810707C (03         ) 01000                   UNDECIDED
004 M810707D (04         ) 00100                   DISAGREE
005 M810707E (05         ) 00010                   STRONGLY DISAGREE
006 M810707M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0041
DESCRIPTION:               AGREE/DISAGREE: ONLY ONE WAY TO SOLVE MATH PROBLEM
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810709                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810709A (01         ) 00000                   STRONGLY AGREE
002 M810709B (02         ) 10000                   AGREE
003 M810709C (03         ) 01000                   UNDECIDED
004 M810709D (04         ) 00100                   DISAGREE
005 M810709E (05         ) 00010                   STRONGLY DISAGREE
006 M810709M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0042
DESCRIPTION:               AGREE/DISAGREE: MATH IS MOSTLY MEMORIZING FACTS
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810708                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810708A (01         ) 00000                   STRONGLY AGREE
002 M810708B (02         ) 10000                   AGREE
003 M810708C (03         ) 01000                   UNDECIDED
004 M810708D (04         ) 00100                   DISAGREE
005 M810708E (05         ) 00010                   STRONGLY DISAGREE
006 M810708M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0043
DESCRIPTION:               AGREE/DISAGREE: CONCEPTS ARE AS IMPORTANT AS OPER
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810710                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810710A (01         ) 00000                   STRONGLY AGREE
002 M810710B (02         ) 10000                   AGREE
003 M810710C (03         ) 01000                   UNDECIDED
004 M810710D (04         ) 00100                   DISAGREE
005 M810710E (05         ) 00010                   STRONGLY DISAGREE
006 M810710M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0044
DESCRIPTION:               DO YOU AGREE: MATH USEFUL/SOLVING EVERYDAY PROBLEM
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810705                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810705A (01         ) 00000                   STRONGLY AGREE
002 M810705B (02         ) 10000                   AGREE
003 M810705C (03         ) 01000                   UNDECIDED
004 M810705D (04         ) 00100                   DISAGREE
005 M810705E (05         ) 00010                   STRONGLY DISAGREE
006 M810705M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0045
DESCRIPTION:               AGREE/DISAGREE: WOULD NOT STUDY MORE MATH
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810706                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       5

001 M810706A (01         ) 00000                   STRONGLY AGREE
002 M810706B (02         ) 10000                   AGREE
003 M810706C (03         ) 01000                   UNDECIDED
004 M810706D (04         ) 00100                   DISAGREE
005 M810706E (05         ) 00010                   STRONGLY DISAGREE
006 M810706M (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:  SUBJ0046
DESCRIPTION:               AGREE/DISAGREE: ALL CAN DO WELL IN MATH IF TRY
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:           N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      M810711
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                  NUMBER OF INDEPENDENT CONTRASTS:        5
001 M810711A (01          ) 00000                 STRONGLY AGREE
002 M810711B (02          ) 10000                 AGREE
003 M810711C (03          ) 01000                 UNDECIDED
004 M810711D (04          ) 00100                 DISAGREE
005 M810711E (05          ) 00010                 STRONGLY DISAGREE
006 M810711M (M           ) 00001                 MISSING

CONDITIONING VARIABLE ID:     BACK0082
DESCRIPTION:                  SINCE KDG, GRADES ATTENDED IN THIS STATE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      B008301
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                  NUMBER OF INDEPENDENT CONTRASTS:        5
001 B008301A (01          ) 00000                 LESS THAN 1 GRADE
002 B008301B (02          ) 10000                 1-2 GRADES
003 B008301C (03          ) 01000                 3-5 GRADES
004 B008301D (04          ) 00100                 6-9 GRADES
005 B008301E (05          ) 00010                 MORE THAN 9 GRADES
006 B008301M (M           ) 00001                 MISSING

CONDITIONING VARIABLE ID:     BACK0083
DESCRIPTION:                  DESCRIBE YOUR OVERALL GRADES SINCE 9TH GRADE
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      B009901
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
                                                  NUMBER OF INDEPENDENT CONTRASTS:        6
001 B009901A (01          ) 000000                MOSTLY A'S
002 B009901B (02          ) 100000                MOSTLY B'S
003 B009901C (03          ) 010000                MOSTLY C'S
004 B009901D (04          ) 001000                MOSTLY D'S
005 B009901E (05          ) 000100                MOSTLY BELOW D'S
006 B009901F (06          ) 000010                CLASSES NOT GRADED
007 B009901M (M           ) 000001                MISSING

CONDITIONING VARIABLE ID:     BACK0084
DESCRIPTION:                  WHICH BEST DESCRIBES YOUR HIGH SCHOOL PROGRAM
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      B008501
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4
001 GENERAL  (01          ) 0000                  GENERAL
002 ACADEMIC (02          ) 1000                  ACADEMIC/COLLEGE PRE
003 VOC/TECH (03          ) 0100                  VOCATIONAL OR TECHN
004 OTHER    (04          ) 0010                  OTHERRADES
005 MISSING  (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:     BACK0085
DESCRIPTION:                  WHAT WILL TAKE LARGEST AMT. OF TIME AFTER HIGH-SCH
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      B005501
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
                                                  NUMBER OF INDEPENDENT CONTRASTS:        6
001 WORKING  (01          ) 000000                WORKING FULL-TIME
002 VOC COLL (02          ) 100000                VOCATIONAL COLLEGE
003 2 YR COL (03          ) 010000                ATTEND 2 YR COLLEGE
004 4 YR COL (04          ) 001000                ATTEND 4 YEAR COLLEG
005 MILITARY (05          ) 000100                MILITARY SERVICE
006 OTHER    (06          ) 000010                OTHERS
007 MISSING  (M           ) 000001                MISSING

CONDITIONING VARIABLE ID:     BACK0086
DESCRIPTION:                  KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      MOTHOCC
TYPE OF CONTRAST:             CLASS               TOTAL NUMBER OF SPECIFIED CONTRASTS:   17
                                                  NUMBER OF INDEPENDENT CONTRASTS:       16
001 NOT PRE  (01,M        ) 0000000000000000      NOT PRESENT IN HOUSEHOLD
002 OFFICE W (02          ) 1000000000000000      OFFICE WORKER
003 TECHNIC  (03          ) 0100000000000000      TECHNICAL
004 PROT SRV (04          ) 0010000000000000      PROTECTIVE SERVICE
005 SALES    (05          ) 0001000000000000      SALES
006 OWNER    (06          ) 0000100000000000      OWNER
007 SERV WRK (07          ) 0000010000000000      SERVICE WORKER
008 SKILL T  (08          ) 0000001000000000      SKILLED TRADESPERSON
009 LABORER  (09          ) 0000000100000000      LABORER
010 OPERATOR (10          ) 0000000010000000      OPERATOR
011 FARMER   (11          ) 0000000001000000      FARMER/FARM MANAGER
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
012 HOMEMAKE (12          ) 0000000000100000          HOMEMAKER
013 MANAGER  (13          ) 0000000000010000          MANAGER
014 MILITARY (14          ) 0000000000001000          MILITARY
015 TEACHER  (15          ) 0000000000000100          SCHOOL TEACHER
016 PROFESS1 (16          ) 0000000000000010          PROFESSIONAL 1
017 PROFESS2 (17          ) 0000000000000001          PROFESSIONAL 2

CONDITIONING VARIABLE ID:  BACK0087
DESCRIPTION:               KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B011A01                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 B011A01M (M           ) 0                         MISSING
002 B011A01N (@           ) 1                         NOT PRESENT IN HOUSEHOLD

CONDITIONING VARIABLE ID:  BACK0088
DESCRIPTION:               KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   FATHOCC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   17
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       16

001 NOT PRES (01,M        ) 0000000000000000          NOT PRESENT IN HOUSEHOLD
002 OFFICE   (02          ) 1000000000000000          OFFICE WORKER
003 TECHNIC  (03          ) 0100000000000000          TECHNICAL
004 PROT SRV (04          ) 0010000000000000          PROTECTIVE SERVICES
005 SALES    (05          ) 0001000000000000          SALES
006 OWNER    (06          ) 0000100000000000          OWNER
007 SERV WRK (07          ) 0000010000000000          SERVICE WORKER
008 SKILL TR (08          ) 0000001000000000          SKILLED TRADEPERSON
009 LABORER  (09          ) 0000000100000000          LABORER
010 OPERATOR (10          ) 0000000010000000          OPERATOR
011 FARMER   (11          ) 0000000001000000          FARMER/FARM MANAGER
012 HOMEMAKE (12          ) 0000000000100000          HOMEMAKER
013 MANAGER  (13          ) 0000000000010000          MANAGER
014 MILITARY (14          ) 0000000000001000          MILITARY
015 TEACHER  (15          ) 0000000000000100          SCHOOL TEACHER
016 PROFESS1 (16          ) 0000000000000010          PROFESSIONAL 1
017 PROFESS2 (17          ) 0000000000000001          PROFESSIONAL 2

CONDITIONING VARIABLE ID:  BACK0089
DESCRIPTION:               KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B012A02                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 B012A02M (M           ) 0                         MISSING
002 B012A02N (@           ) 1                         NOT PRESENT IN HOUSEHOLD

CONDITIONING VARIABLE ID:  SUBJ0047
DESCRIPTION:               ARE YOU TAKING MATH CLASSES THIS YEAR
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M810901                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        2

001 M810901Y (01          ) 00                        YES
002 M810901N (02          ) 10                        NO
003 M810901M (M           ) 01                        MISSING

CONDITIONING VARIABLE ID:  SUBJ0048
DESCRIPTION:               WHAT GRADE DID YOU TAKE 1ST YR ALGEBRA?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811801                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 M811801A (01          ) 00000                     HAVNT TAKEN 1ST YEAR
002 M811801B (02          ) 10000                     BEFORE 9TH GRADE
003 M811801C (03          ) 01000                     9TH GRADE
004 M811801D (04          ) 00100                     10TH GRADE
005 M811801E (05          ) 00010                     11TH OR 12TH GRADE
006 M811801M (M           ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0049
DESCRIPTION:               HOW LONG HAVE YOU TAKEN GENERAL MATH (9-12)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811001                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811001A (01          ) 0000                      MORE THAN 1 YEAR
002 M811001B (02          ) 1000                      1 SCHOOL YEAR
003 M811001C (03          ) 0100                      1/2 YEAR OR LESS
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
004 M811001D (04          ) 0010                     NOT STUDIED
005 M811001M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0050
DESCRIPTION:                HOW LONG HAVE YOU TAKEN BUSINESS OR CONSUMER MATH
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811002                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811002A (01          ) 0000                     MORE THAN 1 YEAR
002 M811002B (02          ) 1000                     1 SCHOOL YEAR
003 M811002C (03          ) 0100                     1/2 YEAR OR LESS
004 M811002D (04          ) 0010                     NOT STUDIED
005 M811002M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0051
DESCRIPTION:                HOW LONG TAKEN APPLIED MATH?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811014                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811014A (01          ) 0000                     MORE THAN 1 YEAR
002 M811014B (02          ) 1000                     1 SCHOOL YEAR
003 M811014C (03          ) 0100                     1/2 YEAR OR LESS
004 M811014D (04          ) 0010                     NOT STUDIED
005 M811014M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0052
DESCRIPTION:                HOW LONG HAVE YOU TAKEN INTRO (PRE) - ALGEBRA
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811003                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811014A (01          ) 0000                     MORE THAN 1 YEAR
002 M811014B (02          ) 1000                     1 SCHOOL YEAR
003 M811014C (03          ) 0100                     1/2 YEAR OR LESS
004 M811014D (04          ) 0010                     NOT STUDIED
005 M811014M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0053
DESCRIPTION:                HOW LONG HAVE YOU STUDIED FIRST-YEAR ALGEBRA
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811004                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811004A (01          ) 0000                     MORE THAN 1 YEAR
002 M811004B (02          ) 1000                     1 SCHOOL YEAR
003 M811004C (03          ) 0100                     1/2 YEAR OR LESS
004 M811004D (04          ) 0010                     NOT STUDIED
005 M811004M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0054
DESCRIPTION:                HOW LONG HAVE YOU TAKEN GEOMETRY
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811005                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811005A (01          ) 0000                     MORE THAN 1 YEAR
002 M811005B (02          ) 1000                     1 SCHOOL YEAR
003 M811005C (03          ) 0100                     1/2 YEAR OR LESS
004 M811005D (04          ) 0010                     NOT STUDIED
005 M811005M (M           ) 0001                     NOT STUDIED

CONDITIONING VARIABLE ID:   SUBJ0055
DESCRIPTION:                HOW LONG HAVE YOU TAKEN SECOND-YEAR ALGEBRA
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811006                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811006A (01          ) 0000                     MORE THAN 1 YEAR
002 M811006B (02          ) 1000                     1 SCHOOL YEAR
003 M811006C (03          ) 0100                     1/2 YEAR OR LESS
004 M811006D (04          ) 0010                     NOT STUDIED
005 M811006M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SUBJ0056
DESCRIPTION:                HOW LONG HAVE YOU TAKEN TRIGONOMETRY
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    M811007                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 M811007A (01           ) 0000                         MORE THAN 1 YEAR
002 M811007B (02           ) 1000                         1 SCHOOL YEAR
003 M811007C (03           ) 0100                         1/2 YEAR OR LESS
004 M811007D (04           ) 0010                         NOT STUDIED
005 M811007M (M            ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0057
DESCRIPTION:               HOW LONG HAVE YOU TAKEN PRE-CALC (3RD YR ALGEBRA)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811008                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811008A (01           ) 0000                         MORE THAN 1 YEAR
002 M811008B (02           ) 1000                         1 SCHOOL YEAR
003 M811008C (03           ) 0100                         1/2 YEAR OR LESS
004 M811008D (04           ) 0010                         NOT STUDIED
005 M811008M (M            ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0058
DESCRIPTION:               HOW LONG TAKEN UNIFIED/INTEGRTD/SEQ MATH?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811012                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811012A (01           ) 0000                         MORE THAN 1 YEAR
002 M811012B (02           ) 1000                         1 SCHOOL YEAR
003 M811012C (03           ) 0100                         1/2 YEAR OR LESS
004 M811012D (04           ) 0010                         NOT STUDIED
005 M811012M (M            ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0059
DESCRIPTION:               HOW LONG HAVE YOU TAKEN PROBABILITY OR STATISTICS
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811009                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811009A (01           ) 0000                         MORE THAN 1 YEAR
002 M811009B (02           ) 1000                         1 SCHOOL YEAR
003 M811009C (03           ) 0100                         1/2 YEAR OR LESS
004 M811009D (04           ) 0010                         NOT STUDIED
005 M811009M (M            ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0060
DESCRIPTION:               HOW LONG HAVE YOU TAKEN CALCULUS
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M811011                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        4

001 M811011A (01           ) 0000                         MORE THAN 1 YEAR
002 M811011B (02           ) 1000                         1 SCHOOL YEAR
003 M811011C (03           ) 0100                         1/2 YEAR OR LESS
004 M811011D (04           ) 0010                         NOT STUDIED
005 M811011M (M            ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0061
DESCRIPTION:               IN/HAVE TAKEN MATH ADVANCED PLACEMENT CLASS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   M812801                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        2

001 M812801Y (01           ) 00                           YES
002 M812801N (02           ) 10                           NOCE OR TWICE A WEEK
003 M812801M (M            ) 01                           MISSING

CONDITIONING VARIABLE ID:  SCHL0003
DESCRIPTION:               BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C030901                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        3

001 C030901A (01           ) 000                          SELF CONTAINED
002 C030901B (02           ) 100                          DEPARTMENTALIZED
003 C030901C (03           ) 010                          REGROUPED
004 C030901M (M            ) 001                          MISSING

CONDITIONING VARIABLE ID:  SCHL0004
DESCRIPTION:               4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT LEVEL?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037101                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          4

001 C037101A (01           ) 0000                           YES, BY MATH ABILITY
002 C037101B (02           ) 1000                           YES, READING ABILITY
003 C037101C (03           ) 0100                           YES, GENERAL ABILITY
004 C037101N (04           ) 0010                           NO
005 C037101M (M            ) 0001                           MISSING

CONDITIONING VARIABLE ID:    SCHL0005
DESCRIPTION:                 HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C031212                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          5

001 C031212A (01           ) 00000                          EVERY DAY
002 C031212B (02           ) 10000                          THREE OR FOUR/WEEK
003 C031212C (03           ) 01000                          ONCE OR TWICE A WEEK
004 C031212D (04           ) 00100                          LESS THAN ONCE/WEEK
005 C031212E (05           ) 00010                          SUBJECT NOT TAUGHT
006 C031212M (M            ) 00001                          MISSING

CONDITIONING VARIABLE ID:    SCHL0006
DESCRIPTION:                 HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C031205                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          5

001 C031205A (01           ) 00000                          EVERY DAY
002 C031205B (02           ) 10000                          THREE OR FOUR/WEEK
003 C031205C (03           ) 01000                          ONCE OR TWICE A WEEK
004 C031205D (04           ) 00100                          LESS THAN ONCE/WEEK
005 C031205E (05           ) 00010                          SUBJECT NOT TAUGHT
006 C031205M (M            ) 00001                          MISSING

CONDITIONING VARIABLE ID:    SCHL0007
DESCRIPTION:                 HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C031213                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          5

001 C031213A (01           ) 00000                          EVERY DAY
002 C031213B (02           ) 10000                          THREE OR FOUR/WEEK
003 C031213C (03           ) 01000                          ONCE OR TWICE A WEEK
004 C031213D (04           ) 00100                          LESS THAN ONCE/WEEK
005 C031213E (05           ) 00010                          SUBJECT NOT TAUGHT
006 C031213M (M            ) 00001                          MISSING

CONDITIONING VARIABLE ID:    SCHL0008
DESCRIPTION:                 HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C031214                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          5

001 C031214A (01           ) 00000                          EVERY DAY
002 C031214B (02           ) 10000                          THREE OR FOUR/WEEK
003 C031214C (03           ) 01000                          ONCE OR TWICE A WEEK
004 C031214D (04           ) 00100                          LESS THAN ONCE/WEEK
005 C031214E (05           ) 00010                          SUBJECT NOT TAUGHT
006 C031214M (M            ) 00001                          MISSING

CONDITIONING VARIABLE ID:    SCHL0009
DESCRIPTION:                 HAS MATH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C031603                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          2

001 C031603Y (01           ) 00                             YES
002 C031603N (02           ) 10                             NO
003 C031603M (M            ) 01                             MISSING

CONDITIONING VARIABLE ID:    SCHL0010
DESCRIPTION:                 HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C031607                        TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:          2

001 C031607Y (01           ) 00                             YES
002 C031607N (02           ) 10                             NO
003 C031607M (M            ) 01                             MISSING

CONDITIONING VARIABLE ID:    SCHL0011
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
DESCRIPTION:                 HAS READING BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C031601               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031601Y (01        ) 00                       YES
002 C031601N (02        ) 10                       NO
003 C031601M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0012
DESCRIPTION:                 HAS ARTS BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C031610               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031610Y (01        ) 00                       YES
002 C031610N (02        ) 10                       NO
003 C031610M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0013
DESCRIPTION:                 HAS SUBJECT INTEGRATION BEEN A PRIORITY?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C031606               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031606Y (01        ) 00                       YES
002 C031606N (02        ) 10                       NO
003 C031606M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0014
DESCRIPTION:                 COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C035701               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035701Y (01        ) 00                       YES
002 C035701N (02        ) 10                       NO
003 C035701M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0015
DESCRIPTION:                 COMPUTERS GROUPED IN SEPARATE LAB AND AVAILABLE?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C035702               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035702Y (01        ) 00                       YES
002 C035702N (02        ) 10                       NO
003 C035702M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0016
DESCRIPTION:                 COMPUTERS AVAILABLE TO BRING TO ROOM WHEN NEEDED?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C035703               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035703Y (01        ) 00                       YES
002 C035703N (02        ) 10                       NO
003 C035703M (M         ) 01                       MISSING

CONDITIONING VARIABLE ID:    SCHL0017
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON MATH?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037201               TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037201Y (01        ) 0                        YES
002 C037201M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:    SCHL0018
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON SCIENCE?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037202               TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037202Y (01        ) 0                        YES
002 C037202M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:    SCHL0019
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON MATH?
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C037207
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037207Y (01           ) 0                      YES
002 C037207M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0020
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON ARTS?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037204
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037204Y (01           ) 0                      YES
002 C037204M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0021
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON OTHER?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037205
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037205Y (01           ) 0                      YES
002 C037205M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0022
DESCRIPTION:                 SCHOOL NOT A SPECIAL FOCUS SCHOOL?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037206
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037206Y (01           ) 0                      YES
002 C037206M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0023
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037301
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037301Y (01           ) 0                      YES
002 C037301M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0024
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE SCIENCE CURRICULUM?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037302
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037302Y (01           ) 0                      YES
002 C037302M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0025
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE READING CURRICULUM?
GRADES/ASSESSMENTS:          N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                     C037303
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037303Y (01           ) 0                      YES
002 C037303M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0026
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037304
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037304Y (01           ) 0                      YES
002 C037304M (M            ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0027
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:          N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037305
TYPE OF CONTRAST:            CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037305Y (01           ) 0                      YES
002 C037305M (M            ) 1                      MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  SCHL0028
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037401              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037401Y (01          ) 0                   YES
002 C037401M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0029
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037402              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037402Y (01          ) 0                   YES
002 C037402M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0030
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037403              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037403Y (01          ) 0                   YES
002 C037403M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0031
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037404              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037404Y (01          ) 0                   YES
002 C037404M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0032
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037405              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037405Y (01          ) 0                   YES
002 C037405M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0033
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037406              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037406Y (01          ) 0                   YES
002 C037406M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0034
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037501              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037501Y (01          ) 0                   YES
002 C037501M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0035
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037502              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037502Y (01          ) 0                   YES
002 C037502M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:  SCHL0036
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037503              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 C037503Y (01          ) 0                         YES
002 C037503M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0037
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037504
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037504Y (01          ) 0                         YES
002 C037504M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0038
DESCRIPTION:               4TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037505
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037505Y (01          ) 0                         YES
002 C037505M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0039
DESCRIPTION:               4TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037601
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037601Y (01          ) 0                         YES
002 C037601M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0040
DESCRIPTION:               4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037602
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037602Y (01          ) 0                         YES
002 C037602M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0041
DESCRIPTION:               4TH GRADERS IN SUMMER PROGRAMS IN READING?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037603
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037603Y (01          ) 0                         YES
002 C037603M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0042
DESCRIPTION:               4TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037604
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037604Y (01          ) 0                         YES
002 C037604M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0043
DESCRIPTION:               4TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   C037605
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037605Y (01          ) 0                         YES
002 C037605M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0044
DESCRIPTION:               WHICH BEST DESCRIBES PRIMARY WAY LIBRARY STAFFED?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C036601
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                      NUMBER OF INDEPENDENT CONTRASTS:        4

001 C036601A (01          ) 0000                      NO LIBRARY IN SCHOOL
002 C036601B (02          ) 1000                      LIBRARY-NO/VOL STAFF
003 C036601C (03          ) 0100                      PART-TIME STAFF
004 C036601D (04          ) 0010                      FULL-TIME STAFF
005 C036601M (M           ) 0001                      MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   SCHL0045
DESCRIPTION:                INVOLVE PARENTS AS AIDES IN CLASSROOM?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032207                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032207A (01          ) 000                      YES, ROUTINELY
002 C032207B (02          ) 100                      YES, OCCASIONALLY
003 C032207N (03          ) 010                      NO
004 C032207M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0046
DESCRIPTION:                HAVE PARENTS REVIEW/SIGN HOMEWORK?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032209                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032209A (01          ) 000                      YES, ROUTINELY
002 C032209B (02          ) 100                      YES, OCCASIONALLY
003 C032209N (03          ) 010                      NO
004 C032209M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0047
DESCRIPTION:                ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032210                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032210A (01          ) 000                      YES, ROUTINELY
002 C032210B (02          ) 100                      YES, OCCASIONALLY
003 C032210N (03          ) 010                      NO
004 C032210M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0048
DESCRIPTION:                HAVE A PARENT VOLUNTEER PROGRAM?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032211                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032211A (01          ) 000                      YES, ROUTINELY
002 C032211B (02          ) 100                      YES, OCCASIONALLY
003 C032211N (03          ) 010                      NO
004 C032211M (M           ) 001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0049
DESCRIPTION:                WHAT % OF PARENTS IN PARENT-TEACHER ORGS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037701                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037701A (01          ) 0000                     0-25%
002 C037701B (02          ) 1000                     26-50%
003 C037701C (03          ) 0100                     51-75%
004 C037701D (04          ) 0010                     76-100%
005 C037701M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SCHL0050
DESCRIPTION:                WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL NIGHT?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037702                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037702A (01          ) 0000                     0-25%
002 C037702B (02          ) 1000                     26-50%
003 C037702C (03          ) 0100                     51-75%
004 C037702D (04          ) 0010                     76-100%
005 C037702M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:   SCHL0051
DESCRIPTION:                WHAT % OF PARENTS IN PARENT-TEACHER CONFERENCES?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037703                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037703A (01          ) 0000                     0-25%
002 C037703B (02          ) 1000                     26-50%
003 C037703C (03          ) 0100                     51-75%
004 C037703D (04          ) 0010                     76-100%
005 C037703M (M           ) 0001                     MISSING
```

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Table C-4 (continued)
Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:   SCHL0052
DESCRIPTION:                WHAT % PARENTS INVOLVED MAKING CURRICULUM DECISION
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037704                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037704A (01         ) 0000                      0-25%
002 C037704B (02         ) 1000                      26-50%
003 C037704C (03         ) 0100                      51-75%
004 C037704D (04         ) 0010                      76-100%
005 C037704M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0053
DESCRIPTION:                WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037705                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037705A (01         ) 0000                      0-25%
002 C037705B (02         ) 1000                      26-50%
003 C037705C (03         ) 0100                      51-75%
004 C037705D (04         ) 0010                      76-100%
005 C037705M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0054
DESCRIPTION:                IS STUDENT ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032402                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032402A (01         ) 0000                      SERIOUS
002 C032402B (02         ) 1000                      MODERATE
003 C032402C (03         ) 0100                      MINOR
004 C032402D (04         ) 0010                      NOT A PROBLEM
005 C032402M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0055
DESCRIPTION:                IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032401                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032401A (01         ) 0000                      SERIOUS
002 C032401B (02         ) 1000                      MODERATE
003 C032401C (03         ) 0100                      MINOR
004 C032401D (04         ) 0010                      NOT A PROBLEM
005 C032401M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0056
DESCRIPTION:                ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032404                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032404A (01         ) 0000                      SERIOUS
002 C032404B (02         ) 1000                      MODERATE
003 C032404C (03         ) 0100                      MINOR
004 C032404D (04         ) 0010                      NOT A PROBLEM
005 C032404M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0057
DESCRIPTION:                IS TEACHER ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032406                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032406A (01         ) 0000                      SERIOUS
002 C032406B (02         ) 1000                      MODERATE
003 C032406C (03         ) 0100                      MINOR
004 C032406D (04         ) 0010                      NOT A PROBLEM
005 C032406M (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0058
DESCRIPTION:                ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032407                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032407A (01         ) 0000                      SERIOUS
002 C032407B (02         ) 1000                      MODERATE
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
003 C032407C (03          ) 0100                        MINOR
004 C032407D (04          ) 0010                        NOT A PROBLEM
005 C032407M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0059
DESCRIPTION:               IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032408                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032408A (01          ) 0000                        SERIOUS
002 C032408B (02          ) 1000                        MODERATE
003 C032408C (03          ) 0100                        MINOR
004 C032408D (04          ) 0010                        NOT A PROBLEM
005 C032408M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0060
DESCRIPTION:               IS LACK OF PARENT INVLMT A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032409                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032409A (01          ) 0000                        SERIOUS
002 C032409B (02          ) 1000                        MODERATE
003 C032409C (03          ) 0100                        MINOR
004 C032409D (04          ) 0010                        NOT A PROBLEM
005 C032409M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0061
DESCRIPTION:               IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032410                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032410A (01          ) 0000                        SERIOUS
002 C032410B (02          ) 1000                        MODERATE
003 C032410C (03          ) 0100                        MINOR
004 C032410D (04          ) 0010                        NOT A PROBLEM
005 C032410M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0062
DESCRIPTION:               IS STUDENT TOBACCO USE A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032411                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032411A (01          ) 0000                        SERIOUS
002 C032411B (02          ) 1000                        MODERATE
003 C032411C (03          ) 0100                        MINOR
004 C032411D (04          ) 0010                        NOT A PROBLEM
005 C032411M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0063
DESCRIPTION:               IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032412                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032412A (01          ) 0000                        SERIOUS
002 C032412B (02          ) 1000                        MODERATE
003 C032412C (03          ) 0100                        MINOR
004 C032412D (04          ) 0010                        NOT A PROBLEM
005 C032412M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0064
DESCRIPTION:               ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032413                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:         4

001 C032413A (01          ) 0000                        SERIOUS
002 C032413B (02          ) 1000                        MODERATE
003 C032413C (03          ) 0100                        MINOR
004 C032413D (04          ) 0010                        NOT A PROBLEM
005 C032413M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:  SCHL0065
DESCRIPTION:               IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032414                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032414A (01             ) 0000                    SERIOUS
002 C032414B (02             ) 1000                    MODERATE
003 C032414C (03             ) 0100                    MINOR
004 C032414D (04             ) 0010                    NOT A PROBLEM
005 C032414M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0066
DESCRIPTION:                   IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C032415                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032415A (01             ) 0000                    SERIOUS
002 C032415B (02             ) 1000                    MODERATE
003 C032415C (03             ) 0100                    MINOR
004 C032415D (04             ) 0010                    NOT A PROBLEM
005 C032415M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0067
DESCRIPTION:                   IS TEACHER MORALE POS. OR NEG.?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C032502                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032502A (01             ) 0000                    VERY POSITIVE
002 C032502B (02             ) 1000                    SOMEWHAT POSITIVE
003 C032502C (03             ) 0100                    SOMEWHAT NEGATIVE
004 C032502D (04             ) 0010                    VERY NEGATIVE
005 C032502M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0068
DESCRIPTION:                   ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C032503                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032503A (01             ) 0000                    VERY POSITIVE
002 C032503B (02             ) 1000                    SOMEWHAT POSITIVE
003 C032503C (03             ) 0100                    SOMEWHAT NEGATIVE
004 C032503D (04             ) 0010                    VERY NEGATIVE
005 C032503M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0069
DESCRIPTION:                   IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C032505                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032505A (01             ) 0000                    VERY POSITIVE
002 C032505B (02             ) 1000                    SOMEWHAT POSITIVE
003 C032505C (03             ) 0100                    SOMEWHAT NEGATIVE
004 C032505D (04             ) 0010                    VERY NEGATIVE
005 C032505M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0070
DESCRIPTION:                   IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C032506                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032506A (01             ) 0000                    VERY POSITIVE
002 C032506B (02             ) 1000                    SOMEWHAT POSITIVE
003 C032506C (03             ) 0100                    SOMEWHAT NEGATIVE
004 C032506D (04             ) 0010                    VERY NEGATIVE
005 C032506M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0071
DESCRIPTION:                   % ABSENT ON AVERAGE DAY?
GRADES/ASSESSMENTS:            N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                       C033601                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:              CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C033601A (01             ) 0000                    0-2%
002 C033601B (02             ) 1000                    3-5%
003 C033601C (03             ) 0100                    6-10%
004 C033601D (04             ) 0010                    MORE THAN 10%
005 C033601M (M              ) 0001                    MISSING

CONDITIONING VARIABLE ID:      SCHL0072
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
DESCRIPTION:                  WHAT % OF TEACHERS ABSENT ON GIVEN DAY?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C036501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        4

001 C036501A (01          ) 0000                         0-2%
002 C036501B (02          ) 1000                         3-5%
003 C036501C (03          ) 0100                         6-10%
004 C036501D (04          ) 0010                         MORE THAN 10%
005 C036501M (M           ) 0001                         MISSING

CONDITIONING VARIABLE ID:     SCHL0073
DESCRIPTION:                  % OF STUDS EROLLED AT START OF YR EROLLED AT END?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C037801                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    9
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        8

001 C037801A (01          ) 00000000                     98-100%
002 C037801B (02          ) 10000000                     95-97%
003 C037801C (03          ) 01000000                     90-94%
004 C037801D (04          ) 00100000                     80-89%
005 C037801E (05          ) 00010000                     70-79%
006 C037801F (06          ) 00001000                     60-69%
007 C037801G (07          ) 00000100                     50-59%
008 C037801H (08          ) 00000010                     LESS THAN 50%
009 C037801M (M           ) 00000001                     MISSING

CONDITIONING VARIABLE ID:     SCHL0074
DESCRIPTION:                  % OF 4TH GRADERS HELD BACK & REPEATING 4TH GRADE?
GRADES/ASSESSMENTS:           N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                      C037901                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 C037901A (01          ) 00000                        0%
002 C037901B (02          ) 10000                        1-2%
003 C037901C (03          ) 01000                        3-5%
004 C037901D (04          ) 00100                        6-10%
005 C037901E (05          ) 00010                        MORE THAN 10%
006 C037901M (M           ) 00001                        MISSING

CONDITIONING VARIABLE ID:     SCHL0075
DESCRIPTION:                  % OF FULL TIME TEACHERS LEFT BEFORE END OF YR?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C038001                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        7

001 C038001A (01          ) 0000000                      0%
002 C038001B (02          ) 1000000                      1-2%
003 C038001C (03          ) 0100000                      3-5%
004 C038001D (04          ) 0010000                      6-10%
005 C038001E (05          ) 0001000                      11-15%
006 C038001F (06          ) 0000100                      16-20%
007 C038001G (07          ) 0000010                      MORE THAN 20%
008 C038001M (M           ) 0000001                      MISSING

CONDITIONING VARIABLE ID:     SCHL0076
DESCRIPTION:                  IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C038301                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038301Y (01          ) 00                           YES
002 C038301N (02          ) 10                           NO
003 C038301M (M           ) 01                           MISSING

CONDITIONING VARIABLE ID:     SCHL0077
DESCRIPTION:                  SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C038801                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038801Y (01          ) 00                           YES
002 C038801N (02          ) 10                           NO
003 C038801M (M           ) 01                           MISSING

CONDITIONING VARIABLE ID:     SCHL0078
DESCRIPTION:                  DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:           N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                      C034101                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 C034101Y (01          ) 0                     YES
002 C034101M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0079
DESCRIPTION:               DID HEADMASTER/HEADMISTRESS FILL OUT QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034102                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034102Y (01          ) 0                     YES
002 C034102M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0080
DESCRIPTION:               DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034103                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034103Y (01          ) 0                     YES
002 C034103M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0081
DESCRIPTION:               DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034104                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034104Y (01          ) 0                     YES
002 C034104M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0082
DESCRIPTION:               DID COUNSELOR FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034105                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034105Y (01          ) 0                     YES
002 C034105M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0083
DESCRIPTION:               DID CURRICULUM COORD FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034106                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034106Y (01          ) 0                     YES
002 C034106M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0084
DESCRIPTION:               DID TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034107                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034107Y (01          ) 0                     YES
002 C034107M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0085
DESCRIPTION:               DID SECRETARY FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034108                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034108Y (01          ) 0                     YES
002 C034108M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  SCHL0086
DESCRIPTION:               DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C034109                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034109Y (01          ) 0                     YES
002 C034109M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:  TCHR0001
DESCRIPTION:               WHAT IS YOUR GENDER?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VAR LABEL:
NAEP ID:                    T055901                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T055901A (01        ) 00                         MALE
002 T055901B (02        ) 10                         FEMALE
003 T055901M (M         ) 01                         MISSING

CONDITIONING VARIABLE ID:   TCHR0002
DESCRIPTION:                WHICH BEST DESRIBES YOU?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056001                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        6

001 T056001A (01        ) 000000                     WHITE
002 T056001B (02        ) 100000                     BLACK
003 T056001C (03        ) 010000                     HISPANIC
004 T056001D (04        ) 001000                     ASIAN/PACIFIC AMERIC
005 T056001E (05        ) 000100                     AMER IND/ALASKA NATV
006 T056001F (06        ) 000010                     OTHER
007 T056001M (M         ) 000001                     MISSING

CONDITIONING VARIABLE ID:   TCHR0003
DESCRIPTION:                YEARS TAUGHT
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040301                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        5

001 T040301A (01        ) 00000                      2 YEARS OR LESS
002 T040301B (02        ) 10000                      3-5 YEARS
003 T040301C (03        ) 01000                      6-10 YEARS
004 T040301D (04        ) 00100                      11-24 YEARS
005 T040301E (05        ) 00010                      25 YEARS OR MORE
006 T040301M (M         ) 00001                      MISSING

CONDITIONING VARIABLE ID:   TCHR0004
DESCRIPTION:                HOW MANY YRS TOTAL YOU TAUGHT MATH?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    T056101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056101A (01        ) 00000                      2 YEARS OR LESS
002 T056101B (02        ) 10000                      3-5 YEARS
003 T056101C (03        ) 01000                      6-10 YEARS
004 T056101D (04        ) 00100                      11-24 YEARS
005 T056101E (05        ) 00010                      25 YEARS OR MORE
006 T056101M (M         ) 00001                      MISSING

CONDITIONING VARIABLE ID:   TCHR0005
DESCRIPTION:                HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?
GRADES/ASSESSMENTS:         N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                    T056102                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056102A (01        ) 00000                      2 YEARS OR LESS
002 T056102B (02        ) 10000                      3-5 YEARS
003 T056102C (03        ) 01000                      6-10 YEARS
004 T056102D (04        ) 00100                      11-24 YEARS
005 T056102E (05        ) 00010                      25 YEARS OR MORE
006 T056102M (M         ) 00001                      MISSING

CONDITIONING VARIABLE ID:   TCHR0006
DESCRIPTION:                TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056201                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        6

001 T056201A (01        ) 000000                     ADVANCED PROFESSIONL
002 T056201B (02        ) 100000                     REGULAR/STANDARD ST
003 T056201C (03        ) 010000                     PROBATIONARY STATE
004 T056201D (04        ) 001000                     TEMPORARY/PROVISIONL
005 T056201E (05        ) 000100                     OTHER THAN STATE CRT
006 T056201F (06        ) 000010                     NOT HAVE CERT MAIN
007 T056201M (M         ) 000001                     MISSING

CONDITIONING VARIABLE ID:   TCHR0007
DESCRIPTION:                CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS ED?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040501                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        3
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 T040501Y (01        ) 000                     YES
002 T040501N (02        ) 100                     NO
003 T040501C (03        ) 010                     NOT OFFERED IN STATE
004 T040501M (M         ) 001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0008
DESCRIPTION:               DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040506                TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040506Y (01        ) 000                     YES
002 T040506N (02        ) 100                     NO
003 T040506C (03        ) 010                     NOT OFFERED IN STATE
004 T040506M (M         ) 001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0009
DESCRIPTION:               DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040504                TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040504Y (01        ) 000                     YES
002 T040504N (02        ) 100                     NO
003 T040504C (03        ) 010                     NOT OFFERED IN STATE
004 T040504M (M         ) 001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0010
DESCRIPTION:               CERTIFICATION, ELEMENTARY SCIENCE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040507                TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040507Y (01        ) 000                     YES
002 T040507N (02        ) 100                     NO
003 T040507C (03        ) 010                     NOT OFFERED IN STATE
004 T040507M (M         ) 001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0011
DESCRIPTION:               CERTIFICATION, MIDDLE/JUNIOR SCIENCE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040508                TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040508Y (01        ) 000                     YES
002 T040508N (02        ) 100                     NO
003 T040508C (03        ) 010                     NOT OFFERED IN STATE
004 T040508M (M         ) 001                     MISSING


CONDITIONING VARIABLE ID:  TCHR0012
DESCRIPTION:               CERTIFICATION, OTHER
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040505                TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040505Y (01        ) 000                     YES
002 T040505N (02        ) 100                     NO
003 T040505C (03        ) 010                     NOT OFFERED IN STATE
004 T040505M (M         ) 001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0013
DESCRIPTION:               HIGHEST ACADEMIC DEGREE YOU HOLD?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056301                TOTAL NUMBER OF SPECIFIED CONTRASTS:   8
TYPE OF CONTRAST:          CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       7

001 T056301A (01        ) 0000000                 HIGH SCHOOL DIPLOMA
002 T056301B (02        ) 1000000                 ASSOCIATES/VOCATIONL
003 T056301C (03        ) 0100000                 BACHELORS DEGREE
004 T056301D (04        ) 0010000                 MASTER'S DEGREE
005 T056301E (05        ) 0001000                 EDUCATION SPECIALIST
006 T056301F (06        ) 0000100                 DOCTORATE
007 T056301G (07        ) 0000010                 PROFESSIONAL DEGREE
008 T056301M (M         ) 0000001                 MISSING

CONDITIONING VARIABLE ID:  TCHR0014
DESCRIPTION:               EDUCATION UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040701                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040701Y (01          ) 0                               YES
002 T040701M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0015
DESCRIPTION:                 ELMENT ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040706                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040706Y (01          ) 0                               YES
002 T040706M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0016
DESCRIPTION:                 SEC ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040707                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040707Y (01          ) 0                               YES
002 T040707M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0017
DESCRIPTION:                 WAS YOUR UNDERGRADUATE MAJOR MATH?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040703                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040703Y (01          ) 0                               YES
002 T040703M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0018
DESCRIPTION:                 WAS YOUR UNDERGRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040704                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040704Y (01          ) 0                               YES
002 T040704M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0019
DESCRIPTION:                 SCIENCE ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040710                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040710Y (01          ) 0                               YES
002 T040710M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0020
DESCRIPTION:                 LIFE SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040711                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040711Y (01          ) 0                               YES
002 T040711M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0021
DESCRIPTION:                 PHYSICAL SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040712                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040712Y (01          ) 0                               YES
002 T040712M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0022
DESCRIPTION:                 EARTH SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040713                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040713Y (01          ) 0                               YES
002 T040713M (M           ) 1                               MISSING

CONDITIONING VARIABLE ID:    TCHR0023
DESCRIPTION:                 SPECIAL EDUCATION UNDERGRAD MAJOR
```

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Table C-4 (continued)
Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040708                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040708Y (01          ) 0                         YES
002 T040708M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0024
DESCRIPTION:                 BILINGUAL ED/ESL  UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040709                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040709Y (01          ) 0                         YES
002 T040709M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0025
DESCRIPTION:                 OTHER UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040705                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040705Y (01          ) 0                         YES
002 T040705M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0026
DESCRIPTION:                 EDUCATION GRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040801                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040801Y (01          ) 0                         YES
002 T040801M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0027
DESCRIPTION:                 ELEMENTARY ED GRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040807                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040807Y (01          ) 0                         YES
002 T040807M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0028
DESCRIPTION:                 SECONDARY ED GRAD MAJOR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040808                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040808Y (01          ) 0                         YES
002 T040808M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0029
DESCRIPTION:                 WAS YOUR GRADUATE MAJOR MATHEMATICS?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040803                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040803Y (01          ) 0                         YES
002 T040803M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0030
DESCRIPTION:                 WAS YOUR GRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040804                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040804Y (01          ) 0                         YES
002 T040804M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    TCHR0031
DESCRIPTION:                 SCIENCE ED GRAD MAJOR?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040814                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T040814Y (01          ) 0                         YES
002 T040814M (M           ) 1                         MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  TCHR0032
DESCRIPTION:               LIFE SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040815                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040815Y (01         ) 0                        YES
002 T040815M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0033
DESCRIPTION:               PHYSICAL SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040816                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040816Y (01         ) 0                        YES
002 T040816M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0034
DESCRIPTION:               EARTH SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040817                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040817Y (01         ) 0                        YES
002 T040817M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0035
DESCRIPTION:               SPECIAL ED GRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040809                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040809Y (01         ) 0                        YES
002 T040809M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0036
DESCRIPTION:               BILINGUAL GRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040810                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040810Y (01         ) 0                        YES
002 T040810M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0037
DESCRIPTION:               ADMIN/SUPERVISION GRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040811                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040811Y (01         ) 0                        YES
002 T040811M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0038
DESCRIPTION:               CURRICULUM/INSTRUCTION GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040812                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040812Y (01         ) 0                        YES
002 T040812M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0039
DESCRIPTION:               COUNSELING GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040813                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040813Y (01         ) 0                        YES
002 T040813M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0040
DESCRIPTION:               OTHER GRAD MAJOR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040805                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 T040805Y (01          ) 0                         YES
002 T040805M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0041
DESCRIPTION:               NO GRADUATE STUDY
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040806                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040806Y (01          ) 0                         YES
002 T040806M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0042
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-EDUCATION
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056401                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056401Y (01          ) 0                         YES
002 T056401M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0043
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056402                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056402Y (01          ) 0                         YES
002 T056402M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0044
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056403                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056403Y (01          ) 0                         YES
002 T056403M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0045
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056404                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056404Y (01          ) 0                         YES
002 T056404M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0046
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056405                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056405Y (01          ) 0                         YES
002 T056405M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0047
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-SCIENCE ED
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056413                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056413Y (01          ) 0                         YES
002 T056413M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0048
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-LIFE SCIENCE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056414                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056414Y (01          ) 0                         YES
002 T056414M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  TCHR0049
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-PHYSICAL SCIENCE
GRADES/ASSESSMENTS:        N04, N08, S08
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VAR LABEL:
NAEP ID:                      T056415                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056415Y (01          ) 0                           YES
002 T056415M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0050
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-EARTH SCIENCE
GRADES/ASSESSMENTS:           N04
CONDITIONING VAR LABEL:
NAEP ID:                      T056416                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056416Y (01          ) 0                           YES
002 T056416M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0051
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056406                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056406Y (01          ) 0                           YES
002 T056406M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0052
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056407                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056407Y (01          ) 0                           YES
002 T056407M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0053
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-ADMIN & SUPERVISION
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056408                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056408Y (01          ) 0                           YES
002 T056408M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0054
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-CURRICULUM & INSTRUC
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056409                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056409Y (01          ) 0                           YES
002 T056409M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0055
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-COUNSELING
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056410                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056410Y (01          ) 0                           YES
002 T056410M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0056
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-OTHER
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056411                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056411Y (01          ) 0                           YES
002 T056411M (M           ) 1                           MISSING

CONDITIONING VARIABLE ID:     TCHR0057
DESCRIPTION:                  UNDERGRAD/GRAD MINOR STUDY-NONE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056412                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056412Y (01          ) 0                           YES
002 T056412M (M           ) 1                           MISSING
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  TCHR0058
DESCRIPTION:               LAST YR, HOW MUCH TIME IN MATH/MATH ED SEM/WRKSHP?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056501A (01         ) 00000                      NONE
002 T056501B (02         ) 10000                      LESS THAN 6 HOURS
003 T056501C (03         ) 01000                      6-15 HOURS
004 T056501D (04         ) 00100                      16-35 HOURS
005 T056501E (05         ) 00010                      MORE THAN 35 HOURS
006 T056501M (M          ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TCHR0059
DESCRIPTION:               LAST YR, HOW MUCH TIME IN SCI/SCI ED SEM/WRKSHPS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T058101                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 T058101A (01         ) 00000                      NONE
002 T058101B (02         ) 10000                      LESS THAN 6 HOURS
003 T058101C (03         ) 01000                      6-15 HOURS
004 T058101D (04         ) 00100                      16-35 HOURS
005 T058101E (05         ) 00010                      MORE THAN 35 HOURS
006 T058101M (M          ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TCHR0060
DESCRIPTION:               LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056601                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056601A (01         ) 00000                      NONE
002 T056601B (02         ) 10000                      ONE
003 T056601C (03         ) 01000                      TWO
004 T056601D (04         ) 00100                      THREE
005 T056601E (05         ) 00010                      FOUR OR MORE
006 T056601M (M          ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TCHR0061
DESCRIPTION:               LAST 2 YRS, HOW MANY SCI/SCI ED UNIV COURSES?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T058201                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 T058201A (01         ) 00000                      NONE
002 T058201B (02         ) 10000                      ONE
003 T058201C (03         ) 01000                      TWO
004 T058201D (04         ) 00100                      THREE
005 T058201E (05         ) 00010                      FOUR OR MORE
006 T058201M (M          ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TCHR0062
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM USE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056701                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056701Y (01         ) 0                          YES
002 T056701M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0063
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056702                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056702Y (01         ) 0                          YES
002 T056702M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0064
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP INSTRCT
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056703                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056703Y (01         ) 0                          YES
002 T056703M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0065
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
DESCRIPTION:                 PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056704                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056704Y (01         ) 0                            YES
002 T056704M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0066
DESCRIPTION:                 PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056705                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056705Y (01         ) 0                            YES
002 T056705M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0067
DESCRIPTION:                 PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED ASSMNT
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056706                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056706Y (01         ) 0                            YES
002 T056706M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0068
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER THKG
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056707                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056707Y (01         ) 0                            YES
002 T056707M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0069
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT BKGD
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056708                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056708Y (01         ) 0                            YES
002 T056708M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0070
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056709                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056709Y (01         ) 0                            YES
002 T056709M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0071
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED STDS
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056710                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056710Y (01         ) 0                            YES
002 T056710M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0072
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056711                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056711Y (01         ) 0                            YES
002 T056711M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:    TCHR0073
DESCRIPTION:                 PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056712                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056712Y (01         ) 0                            YES
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
002 T056712M (M          ) 1                                 MISSING

CONDITIONING VARIABLE ID:  TCHR0074
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056713                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056713Y (01         ) 0                                 YES
002 T056713M (M          ) 1                                 MISSING

CONDITIONING VARIABLE ID:  TCHR0075
DESCRIPTION:               AVAILABILITY OF RESOURCES
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T041201                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        4

001 T041201A (01         ) 0000                              GET ALL RESOURCES
002 T041201B (02         ) 1000                              GET MOST RESOURCES
003 T041201C (03         ) 0100                              GET SOME RESOURCES
004 T041201D (04         ) 0010                              DONT GET RESOURCES
005 T041201M (M          ) 0001                              MISSING

CONDITIONING VARIABLE ID:  TCHR0076
DESCRIPTION:               ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   T041302                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        2

001 T041302Y (01         ) 00                                YES
002 T041302N (02         ) 10                                NO
003 T041302M (M          ) 01                                MISSING

CONDITIONING VARIABLE ID:  TCHR0077
DESCRIPTION:               SCIENCE CURRICULUM SPECIALIST
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   T041303                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        2

001 T041303Y (01         ) 00                                YES
002 T041303N (02         ) 10                                NO
003 T041303M (M          ) 01                                MISSING

CONDITIONING VARIABLE ID:  TCHR0078
DESCRIPTION:               HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                 . T056801                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        6

001 T056801A (01         ) 000000                            NONE
002 T056801B (02         ) 100000                            LESS THAN ONE
003 T056801C (03         ) 010000                            1-2
004 T056801D (04         ) 001000                            3-4
005 T056801E (05         ) 000100                            5
006 T056801F (06         ) 000010                            MORE THAN 5
007 T056801M (M          ) 000001                            MISSING

CONDITIONING VARIABLE ID:  TCHR0079
DESCRIPTION:               METHODS OF TEACHING ELEM MATH- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056901                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056901Y (01         ) 0                                 YES
002 T056901M (M          ) 1                                 MISSING

CONDITIONING VARIABLE ID:  TCHR0080
DESCRIPTION:               METHODS OF TEACHING ELEM MATH-PART COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T0569A1                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                             NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569A1Y (01         ) 0                                 YES
002 T0569A1M (M          ) 1                                 MISSING

CONDITIONING VARIABLE ID:  TCHR0081
DESCRIPTION:               METHODS OF TEACHING ELEM MATH-SEMINAR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T0569B1                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569B1Y (01        ) 0                                YES
002 T0569B1M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0082
DESCRIPTION:                  METHODS OF TEACHING ELEM MATH-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569C1                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569C1Y (01        ) 0                                YES
002 T0569C1M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0083
DESCRIPTION:                  NUMBER SYSTEMS & NUMERATION-1+ COLLEGE COURSE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056902                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056902Y (01        ) 0                                YES
002 T056902M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0084
DESCRIPTION:                  NUMBER SYSTEMS & NUMERATION-PART COLLEGE COURSE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569A2                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569A2Y (01        ) 0                                YES
002 T0569A2M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0085
DESCRIPTION:                  NUMBER SYSTEMS & NUMERATION-SEMINAR
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569B2                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569B2Y (01        ) 0                                YES
002 T0569B2M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0086
DESCRIPTION:                  NUMBER SYSTEMS & NUMERATION-LITTLE/NO EXPOSURE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569C2                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569C2Y (01        ) 0                                YES
002 T0569C2M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0087
DESCRIPTION:                  MEASUREMENT IN MATH- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T056903                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T056903Y (01        ) 0                                YES
002 T056903M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0088
DESCRIPTION:                  MEASUREMENT IN MATH- PART COLLEGE COURSE
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569A3                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569A3Y (01        ) 0                                YES
002 T0569A3M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0089
DESCRIPTION:                  MEASUREMENT IN MATH- -SEMINAR
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T0569B3                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569B3Y (01        ) 0                                YES
002 T0569B3M (M         ) 1                                MISSING

CONDITIONING VARIABLE ID:     TCHR0090
DESCRIPTION:                  MEASUREMENT IN MATH- -LITTLE NO EXPOSURE
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569C3
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569C3Y (01        ) 0                          YES
002 T0569C3M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0091
DESCRIPTION:                 GEOMETRY- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056904
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056904Y (01        ) 0                          YES
002 T056904M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0092
DESCRIPTION:                 GEOMETRY-PART COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569A4
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569A4Y (01        ) 0                          YES
002 T0569A4M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0093
DESCRIPTION:                 GEOMETRY-SEMINAR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569B4
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569B4Y (01        ) 0                          YES
002 T0569B4M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0094
DESCRIPTION:                 GEOMETRY-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569C4
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569C4Y (01        ) 0                          YES
002 T0569C4M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0095
DESCRIPTION:                 PROBABILITY/STATISTICS- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056905
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056905Y (01        ) 0                          YES
002 T056905M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0096
DESCRIPTION:                 PROBABILITY/STATISTICS-PART COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569A5
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569A5Y (01        ) 0                          YES
002 T0569A5M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0097
DESCRIPTION:                 PROBABILITY/STATISTICS-SEMINAR
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569B5
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569B5Y (01        ) 0                          YES
002 T0569B5M (M         ) 1                          MISSING

CONDITIONING VARIABLE ID:    TCHR0098
DESCRIPTION:                 PROBABILITY/STATISTICS-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:          N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T0569C5
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                     NUMBER OF INDEPENDENT CONTRASTS:       1
001 T0569C5Y (01        ) 0                          YES
002 T0569C5M (M         ) 1                          MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  TCHR0099
DESCRIPTION:               COLLEGE ALGEBRA- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T056906                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T056906Y (01        ) 0                             YES
002 T056906M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0100
DESCRIPTION:               COLLEGE ALGEBRA-PART COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569A6                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569A6Y (01        ) 0                             YES
002 T0569A6M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0101
DESCRIPTION:               COLLEGE ALGEBRA-SEMINAR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569B6                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569B6Y (01        ) 0                             YES
002 T0569B6M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0102
DESCRIPTION:               COLLEGE ALGEBRA-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569C6                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569C6Y (01        ) 0                             YES
002 T0569C6M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0103
DESCRIPTION:               CALCULUS- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T056907                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T056907Y (01        ) 0                             YES
002 T056907M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0104
DESCRIPTION:               CALCULUS-PART COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569A7                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569A7Y (01        ) 0                             YES
002 T0569A7M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0105
DESCRIPTION:               CALCULUS-SEMINAR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569B7                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569B7Y (01        ) 0                             YES
002 T0569B7M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0106
DESCRIPTION:               CALCULUS-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T0569C7                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T0569C7Y (01        ) 0                             YES
002 T0569C7M (M         ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0107
DESCRIPTION:               ABSTRACT/LINEAR ALGEBRA- 1+COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:                                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T056908                      NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 T056908Y (01          ) 0                       YES
002 T056908M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0108
DESCRIPTION:               ABSTRACT/LINEAR ALGEBRA-PART COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T0569A8                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569A8Y (01          ) 0                       YES
002 T0569A8M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0109
DESCRIPTION:               ABSTRACT/LINEAR ALGEBRA-SEMINAR
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T0569B8                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569B8Y (01          ) 0                       YES
002 T0569B8M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0110
DESCRIPTION:               ABSTRACT/LINEAR ALGEBRA-LITTLE NO EXPOSURE
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T0569C8                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 T0569C8Y (01          ) 0                       YES
002 T0569C8M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0111
DESCRIPTION:               EVER STUDIED ESTIMATION?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057001                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T057001Y (01          ) 00                      YES
002 T057001N (02          ) 10                      NO
003 T057001M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:  TCHR0112
DESCRIPTION:               EVER STUDIED PROBLEM SOLVING IN MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057002                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T057002Y (01          ) 00                      YES
002 T057002N (02          ) 10                      NO
003 T057002M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:  TCHR0113
DESCRIPTION:               EVER STUDIED USE OF MANIPULATIVES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057003                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T057003Y (01          ) 00                      YES
002 T057003N (02          ) 10                      NO
003 T057003M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:  TCHR0114
DESCRIPTION:               EVER STUDIED USE OF CALCULATORS IN MATH INSTRC?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057004                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T057004Y (01          ) 00                      YES
002 T057004N (02          ) 10                      NO
003 T057004M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:  TCHR0115
DESCRIPTION:               EVER STUDIED UNDERSTANDING STUDS MATH THINKING?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057005                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 T057005Y (01          ) 00                      YES
002 T057005N (02          ) 10                      NO
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
003 T057005M (M          ) 01                           MISSING

CONDITIONING VARIABLE ID:  TCHR0116
DESCRIPTION:               EVER STUDIED GENDER ISSUES IN TEACHING MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057006                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       2

001 T057006Y (01         ) 00                           YES
002 T057006N (02         ) 10                           NO
003 T057006M (M          ) 01                           MISSING

CONDITIONING VARIABLE ID:  TCHR0117
DESCRIPTION:               EVER STUDIED TEACHING STUDS OF DIFF CULTURES?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057007                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       2

001 T057007Y (01         ) 00                           YES
002 T057007N (02         ) 10                           NO
003 T057007M (M          ) 01                           MISSING

CONDITIONING VARIABLE ID:  TCHR0118
DESCRIPTION:               KNOWLEDGE OF NCTM CURR & EVAL STANDARDS FOR MATH?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057101                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       4

001 T057101A (01         ) 0000                         VERY KNOWLEDGEABLE
002 T057101B (02         ) 1000                         KNOWLEDGEABLE
003 T057101C (03         ) 0100                         SOMEWHAT KNOWLEDGEAB
004 T057101D (04         ) 0010                         LITTLE/NO KNOWLEDGE
005 T057101M (M          ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TCHR0119
DESCRIPTION:               PRO ACTVTS-STRATEGIES LOCAL WORKSHOPS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057201                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       1

001 T057201Y (01         ) 0                            YES
002 T057201M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0120
DESCRIPTION:               PRO ACTVTS-STRATEGIES REGIONAL NCTM MEETING
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057211                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       1

001 T057211Y (01         ) 0                            YES
002 T057211M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0121
DESCRIPTION:               PRO ACTVTS-STRATEGIES NATIONAL NCTM MEETING
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057221                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       1

001 T057221Y (01         ) 0                            YES
002 T057221M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0122
DESCRIPTION:               PRO ACTVTS-STRATEGIES OTHER
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057231                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       1

001 T057231Y (01         ) 0                            YES
002 T057231M (M          ) 1                            MISSING

CONDITIONING VARIABLE ID:  TCHR0123
DESCRIPTION:               PRO ACTVTS-STRATEGIES NO
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057241                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:       1

001 T057241Y (01         ) 0                            YES
002 T057241M (M          ) 1                            MISSING
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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CONDITIONING VARIABLE ID:  TSUB0001
DESCRIPTION:               IMPORTANCE W/ STUDS-APPLYING MATH IDEAS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057301
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057301A (01          ) 0000                  VERY IMPORTANT
002 T057301B (02          ) 1000                  SOMEWHAT IMPORTANT
003 T057301C (03          ) 0100                  NOT VERY IMPORTANT
004 T057301D (04          ) 0010                  NOT IMPORTANT
005 T057301M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0002
DESCRIPTION:               IMPORTANCE W/ STUDS-PROB SOLVING=GOAL & CONCEPT?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057302
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057302A (01          ) 0000                  VERY IMPORTANT
002 T057302B (02          ) 1000                  SOMEWHAT IMPORTANT
003 T057302C (03          ) 0100                  NOT VERY IMPORTANT
004 T057302D (04          ) 0010                  NOT IMPORTANT
005 T057302M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0003
DESCRIPTION:               IMPORTANCE W/ STUDS-? TECHS PROMOTE STUD TALK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057303
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057303A (01          ) 0000                  VERY IMPORTANT
002 T057303B (02          ) 1000                  SOMEWHAT IMPORTANT
003 T057303C (03          ) 0100                  NOT VERY IMPORTANT
004 T057303D (04          ) 0010                  NOT IMPORTANT
005 T057303M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0004
DESCRIPTION:               IMPORTANCE W/ STUDS-USE RESULTS TO INFORM DECISION
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057304
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057304A (01          ) 0000                  VERY IMPORTANT
002 T057304B (02          ) 1000                  SOMEWHAT IMPORTANT
003 T057304C (03          ) 0100                  NOT VERY IMPORTANT
004 T057304D (04          ) 0010                  NOT IMPORTANT
005 T057304M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0005
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE MULT CHOICE TESTS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057401
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057401A (01          ) 0000                  ONCE OR TWICE A WEEK
002 T057401B (02          ) 1000                  ONCE OR TWICE MONTH
003 T057401C (03          ) 0100                  ONCE OR TWICE A YEAR
004 T057401D (04          ) 0010                  NEVER/HARDLY EVER
005 T057401M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0006
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE PROBLEM SETS
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057402
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057402A (01          ) 0000                  ONCE OR TWICE A WEEK
002 T057402B (02          ) 1000                  ONCE OR TWICE MONTH
003 T057402C (03          ) 0100                  ONCE OR TWICE A YEAR
004 T057402D (04          ) 0010                  NEVER/HARDLY EVER
005 T057402M (M           ) 0001                  MISSING

CONDITIONING VARIABLE ID:  TSUB0007
DESCRIPTION:               TO ACCESS PROGRESS HOW OFTEN USE SHORT WRITTEN RSP
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T057403
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057403A (01          ) 0000                  ONCE OR TWICE A WEEK
002 T057403B (02          ) 1000                  ONCE OR TWICE MONTH
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
003 T057403C (03          ) 0100                        ONCE OR TWICE A YEAR
004 T057403D (04          ) 0010                        NEVER/HARDLY EVER
005 T057403M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:   TSUB0008
DESCRIPTION:                TO ACCESS PROGRESS HOW OFTEN USE INDV/GROUP PRJCTS
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T057404                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057404A (01          ) 0000                        ONCE OR TWICE A WEEK
002 T057404B (02          ) 1000                        ONCE OR TWICE MONTH
003 T057404C (03          ) 0100                        ONCE OR TWICE A YEAR
004 T057404D (04          ) 0010                        NEVER/HARDLY EVER
005 T057404M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:   TSUB0009
DESCRIPTION:                TO ACCESS PROGRESS HOW OFTEN USE PORTFOLIOS
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T057405                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057405A (01          ) 0000                        ONCE OR TWICE A WEEK
002 T057405B (02          ) 1000                        ONCE OR TWICE MONTH
003 T057405C (03          ) 0100                        ONCE OR TWICE A YEAR
004 T057405D (04          ) 0010                        NEVER/HARDLY EVER
005 T057405M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:   TSUB0010
DESCRIPTION:                BEST DESCRIPTION OF COMPUTER AVAILABLITY IN MATH
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T057501                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        6

001 T057501A (01          ) 000000                      NONE AVAILABLE
002 T057501B (02          ) 100000                      ONE IN CLASS
003 T057501C (03          ) 010000                      2 OR 3 IN CLASS
004 T057501D (04          ) 001000                      4 OR MORE IN CLASS
005 T057501E (05          ) 000100                      DIFFICULT TO ACCESS
006 T057501F (06          ) 000010                      EASY TO ACCESS
007 T057501M (M           ) 000001                      MISSING

CONDITIONING VARIABLE ID:   TSUB0011
DESCRIPTION:                PRIMARY USE OF COMPUTERS FOR MATH INSTRUCTION?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T057601                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T057601A (01          ) 00000                       DRILL AND PRACTICE
002 T057601B (02          ) 10000                       DEMO OF NEW TOPICS
003 T057601C (03          ) 01000                       PLAYING MATH GAMES
004 T057601D (04          ) 00100                       STIMULATIONS/APPS
005 T057601E (05          ) 00010                       DO NOT USE COMPUTERS
006 T057601M (M           ) 00001                       MISSING

CONDITIONING VARIABLE ID:   TSUB0012
DESCRIPTION:                ARE STUDENTS ASSIGNED TO THIS CLASS BY ABILITY?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T044002                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 T044002Y (01          ) 00                          YES
002 T044002N (02          ) 10                          NO
003 T044002M (M           ) 01                          MISSING

CONDITIONING VARIABLE ID:   TSUB0013
DESCRIPTION:                IF ASSIGNED BY ABILITY, WHAT BASIS ASSIGNED?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T057701                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057701A (01          ) 0000                        NOT BY ABILITY
002 T057701B (02          ) 1000                        BY READING ABILITY
003 T057701C (03          ) 0100                        BY MATH ABILITY
004 T057701D (04          ) 0010                        BY GENERAL ABILITY
005 T057701M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:   TSUB0014
DESCRIPTION:                IF ASSIGNED BY ABILITY, WHAT IS MATH ABILITY?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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NAEP ID:                      T057801
TYPE OF CONTRAST:             CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                        NUMBER OF INDEPENDENT CONTRASTS:        5

001 T057801A (01            ) 00000                     NOT BY ABILITY
002 T057801B (02            ) 10000                     HIGH ABILITY
003 T057801C (03            ) 01000                     AVERAGE ABILITY
004 T057801D (04            ) 00100                     LOW ABILITY
005 T057801E (05            ) 00010                     MIXED ABILITY
006 T057801M (M             ) 00001                     MISSING

CONDITIONING VARIABLE ID:     TSUB0015
DESCRIPTION:                  CREATE GROUPS IN CLASS FOR MATH ON ABILITY BASIS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044201                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 T044201Y (01            ) 00                        YES
002 T044201N (02            ) 10                        NO
003 T044201M (M             ) 01                        MISSING

CONDITIONING VARIABLE ID:     TSUB0016
DESCRIPTION:                  TIME/WEEK ON MATH INSTRUTION?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044301                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 T044301A (01            ) 000                       2 1/2 HOURS OR LESS
002 T044301B (02            ) 100                       > 2 1/2 HRS-< 4 HRS
003 T044301C (03            ) 010                       4 HRS OR MORE
004 T044301M (M             ) 001                       MISSING

CONDITIONING VARIABLE ID:     TSUB0017
DESCRIPTION:                  HOW MUCH TIME PER WEEK STUDS DO MATH W/ PARTNER?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T057901                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 T057901A (01            ) 0000                      NONE
002 T057901B (02            ) 1000                      LESS THAN 1/2 HOUR
003 T057901C (03            ) 0100                      1/2-1 HOUR
004 T057901D (04            ) 0010                      MORE THAN 1 HOUR
005 T057901M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:     TSUB0018
DESCRIPTION:                  AMOUNT MATH HOMEWORK ASSIGN/DAY?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044401                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        6

001 T044401A (01            ) 000000                    NONE
002 T044401B (02            ) 100000                    15 MINUTES
003 T044401C (03            ) 010000                    30 MINUTES
004 T044401D (04            ) 001000                    45 MINUTES
005 T044401E (05            ) 000100                    ONE HOUR
006 T044401F (06            ) 000010                    MORE THAN ONE HOUR
007 T044401M (M             ) 000001                    MISSING

CONDITIONING VARIABLE ID:     TSUB0019
DESCRIPTION:                  HOW OFTEN DO STUDENTS DO MATH FROM TEXTBOOKS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044501                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044501A (01            ) 0000                      ALMOST EVERY DAY
002 T044501B (02            ) 1000                      ONCE OR TWICE A WEEK
003 T044501C (03            ) 0100                      ONCE OR TWICE MONTH
004 T044501D (04            ) 0010                      NEVER OR HARDLY EVER
005 T044501M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:     TSUB0020
DESCRIPTION:                  HOW OFTEN DO STUDENTS DO MATH ON WORKSHEETS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044502                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:             CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044502A (01            ) 0000                      ALMOST EVERY DAY
002 T044502B (02            ) 1000                      ONCE OR TWICE A WEEK
003 T044502C (03            ) 0100                      ONCE OR TWICE MONTH
004 T044502D (04            ) 0010                      NEVER OR HARDLY EVER
005 T044502M (M             ) 0001                      MISSING
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

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CONDITIONING VARIABLE ID:  TSUB0021
DESCRIPTION:               HOW OFTEN DO STUDENTS SOLVE PROBS W/ OTHER STUDS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044512                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044512A (01        ) 0000                         ALMOST EVERY DAY
002 T044512B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044512C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044512D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044512M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0022
DESCRIPTION:               HOW OFTEN DO STUDENTS WORK W/ OBJECTS LIKE RULERS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044513                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044513A (01        ) 0000                         ALMOST EVERY DAY
002 T044513B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044513C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044513D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044513M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0023
DESCRIPTION:               HOW OFTEN WORK W/ COUNTING BLOCKS.GEOMETRIC SHAPES
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044514                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044514A (01        ) 0000                         ALMOST EVERY DAY
002 T044514B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044514C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044514D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044514M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0024
DESCRIPTION:               HOW OFTEN DO STUDENTS USE A CALCULATOR?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044505                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044505A (01        ) 0000                         ALMOST EVERY DAY
002 T044505B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044505C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044505D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044505M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0025
DESCRIPTION:               HOW OFTEN DO STUDENTS TAKE MATH TESTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044515                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044515A (01        ) 0000                         ALMOST EVERY DAY
002 T044515B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044515C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044515D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044515M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0026
DESCRIPTION:               HOW OFTEN DO STUDENTS WRITE ABOUT PROBLEM-SOLVING?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044507                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044507A (01        ) 0000                         ALMOST EVERY DAY
002 T044507B (02        ) 1000                         ONCE OR TWICE A WEEK
003 T044507C (03        ) 0100                         ONCE OR TWICE MONTH
004 T044507D (04        ) 0010                         NEVER OR HARDLY EVER
005 T044507M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  TSUB0027
DESCRIPTION:               HOW OFTEN DO STUDENTS TALK ABOUT MATH WORK?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044516                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       4

001 T044516A (01        ) 0000                         ALMOST EVERY DAY
002 T044516B (02        ) 1000                         ONCE OR TWICE A WEEK
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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
003 T044516C (03          ) 0100                 ONCE OR TWICE MONTH
004 T044516D (04          ) 0010                 NEVER OR HARDLY EVER
005 T044516M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0028
DESCRIPTION:               HOW OFTEN DO STUDENTS WRITE REPORTS/DO PROJECTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044508               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044508A (01          ) 0000                 ALMOST EVERY DAY
002 T044508B (02          ) 1000                 ONCE OR TWICE A WEEK
003 T044508C (03          ) 0100                 ONCE OR TWICE MONTH
004 T044508D (04          ) 0010                 NEVER OR HARDLY EVER
005 T044508M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0029
DESCRIPTION:               HOW OFTEN DO STUDENTS DISCUSS MATH W/OTHER STDNTS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044509               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044509A (01          ) 0000                 ALMOST EVERY DAY
002 T044509B (02          ) 1000                 ONCE OR TWICE A WEEK
003 T044509C (03          ) 0100                 ONCE OR TWICE MONTH
004 T044509D (04          ) 0010                 NEVER OR HARDLY EVER
005 T044509M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0030
DESCRIPTION:               HOW OFTEN DO STUDENTS WORK REAL-LIFE MATH PRBLMS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044510               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044510A (01          ) 0000                 ALMOST EVERY DAY
002 T044510B (02          ) 1000                 ONCE OR TWICE A WEEK
003 T044510C (03          ) 0100                 ONCE OR TWICE MONTH
004 T044510D (04          ) 0010                 NEVER OR HARDLY EVER
005 T044510M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0031
DESCRIPTION:               HOW OFTEN DO STUDENTS USE A COMPUTER?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T044506               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T044506A (01          ) 0000                 ALMOST EVERY DAY
002 T044506B (02          ) 1000                 ONCE OR TWICE A WEEK
003 T044506C (03          ) 0100                 ONCE OR TWICE MONTH
004 T044506D (04          ) 0010                 NEVER OR HARDLY EVER
005 T044506M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0032
DESCRIPTION:               IN MATH CLASS HOW OFTEN ADDRESS-NUMBERS & OPS?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058001               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058001A (01          ) 0000                 A LOT
002 T058001B (02          ) 1000                 SOME
003 T058001C (03          ) 0100                 A LITTLE
004 T058001D (04          ) 0010                 NONE
005 T058001M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0033
DESCRIPTION:               IN MATH CLASS HOW OFTEN ADDRESS-MEASUREMENT?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058002               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T058002A (01          ) 0000                 A LOT
002 T058002B (02          ) 1000                 SOME
003 T058002C (03          ) 0100                 A LITTLE
004 T058002D (04          ) 0010                 NONE
005 T058002M (M           ) 0001                 MISSING

CONDITIONING VARIABLE ID:  TSUB0034
DESCRIPTION:               IN MATH CLASS HOW OFTEN ADDRESS-GEOMETRY?
GRADES/ASSESSMENTS:        N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058003               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058003A (01          ) 0000                    A LOT
002 T058003B (02          ) 1000                    SOME
003 T058003C (03          ) 0100                    A LITTLE
004 T058003D (04          ) 0010                    NONE
005 T058003M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0035
DESCRIPTION:                IN MATH CLASS HOW OFTEN ADDRESS-DATA ANALYSIS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058004                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058004A (01          ) 0000                    A LOT
002 T058004B (02          ) 1000                    SOME
003 T058004C (03          ) 0100                    A LITTLE
004 T058004D (04          ) 0010                    NONE
005 T058004M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0036
DESCRIPTION:                IN MATH CLASS HOW OFTEN ADDRESS-ALGEBRA & FUNCT?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058005                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058005A (01          ) 0000                    A LOT
002 T058005B (02          ) 1000                    SOME
003 T058005C (03          ) 0100                    A LITTLE
004 T058005D (04          ) 0010                    NONE
005 T058005M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0037
DESCRIPTION:                IN MATH HOW OFTEN ADDRESS-LRN MATH FACTS/CONCEPTS?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058006                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058006A (01          ) 0000                    A LOT
002 T058006B (02          ) 1000                    SOME
003 T058006C (03          ) 0100                    A LITTLE
004 T058006D (04          ) 0010                    NONE
005 T058006M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0038
DESCRIPTION:                IN MATH HOW OFTEN ADDRESS-LRN SKILLS/PROCEDURES?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058007                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058007A (01          ) 0000                    A LOT
002 T058007B (02          ) 1000                    SOME
003 T058007C (03          ) 0100                    A LITTLE
004 T058007D (04          ) 0010                    NONE
005 T058007M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0039
DESCRIPTION:                IN MATH HOW OFTEN ADDRESS-DEVELOP REASONING ABLTY?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058008                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058008A (01          ) 0000                    A LOT
002 T058008B (02          ) 1000                    SOME
003 T058008C (03          ) 0100                    A LITTLE
004 T058008D (04          ) 0010                    NONE
005 T058008M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0040
DESCRIPTION:                IN MATH HOW OFTEN ADDRESS-LRN TO COMMUNICATE MATH?
GRADES/ASSESSMENTS:         N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T058009                 TOTAL NUMBER OF SPECIFIED CONTRASTS:  5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:      4

001 T058009A (01          ) 0000                    A LOT
002 T058009B (02          ) 1000                    SOME
003 T058009C (03          ) 0100                    A LITTLE
004 T058009D (04          ) 0010                    NONE
005 T058009M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   TSUB0041
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
DESCRIPTION:                  DO YOU PERMIT UNRESTRICTED USE OF CALCULATORS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045401
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
                                                    NUMBER OF INDEPENDENT CONTRASTS:       2
001 T045401Y (01        ) 00
002 T045401N (02        ) 10                        YES
003 T045401M (M         ) 01                        NO
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0042
DESCRIPTION:                  DO YOU PERMIT USE OF CALCULATORS ON TESTS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044801
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
                                                    NUMBER OF INDEPENDENT CONTRASTS:       2
001 T044801Y (01        ) 00
002 T044801N (02        ) 10                        YES
003 T044801M (M         ) 01                        NO
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0043
DESCRIPTION:                  STUDENTS HAVE ACCESS TO SCHL-OWNED CALCULATORS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045001
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
                                                    NUMBER OF INDEPENDENT CONTRASTS:       2
001 T045001Y (01        ) 00
002 T045001N (02        ) 10                        YES
003 T045001M (M         ) 01                        NO
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0044
DESCRIPTION:                  DO YOU PROVIDE INSTRUCTION IN USE OF CALCULATORS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044901
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
                                                    NUMBER OF INDEPENDENT CONTRASTS:       2
001 T044901Y (01        ) 00
002 T044901N (02        ) 10                        YES
003 T044901M (M         ) 01                        NO
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0045
DESCRIPTION:                  HOW PREPARED TO TEACH MATH CONCEPTS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045304
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                    NUMBER OF INDEPENDENT CONTRASTS:       4
001 T045304A (01        ) 0000
002 T045304B (02        ) 1000                      VERY WELL PREPARED
003 T045304C (03        ) 0100                      MODERATELY PREPARED
004 T045304D (04        ) 0010                      NOT VERY PREPARED
005 T045304M (M         ) 0001                      NOT AT ALL PREPARED
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0046
DESCRIPTION:                  HOW PREPARED TO TEACH MATH PROCEDURES?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045305
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                    NUMBER OF INDEPENDENT CONTRASTS:       4
001 T045305A (01        ) 0000
002 T045305B (02        ) 1000                      VERY WELL PREPARED
003 T045305C (03        ) 0100                      MODERATELY PREPARED
004 T045305D (04        ) 0010                      NOT VERY PREPARED
005 T045305M (M         ) 0001                      NOT AT ALL PREPARED
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0047
DESCRIPTION:                  HOW PREPARED TO TEACH USE OF COMPUTERS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045302
TYPE OF CONTRAST:             CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                    NUMBER OF INDEPENDENT CONTRASTS:       4
001 T045302A (01        ) 0000
002 T045302B (02        ) 1000                      VERY WELL PREPARED
003 T045302C (03        ) 0100                      MODERATELY PREPARED
004 T045302D (04        ) 0010                      NOT VERY PREPARED
005 T045302M (M         ) 0001                      NOT AT ALL PREPARED
                                                    MISSING

CONDITIONING VARIABLE ID:     TSUB0048
DESCRIPTION:                  HOW PREPARED TO TEACH USE OF CALCULATORS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T045303               TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          4

001 T045303A (01         ) 0000                            VERY WELL PREPARED
002 T045303B (02         ) 1000                            MODERATELY PREPARED
003 T045303C (03         ) 0100                            NOT VERY PREPARED
004 T045303D (04         ) 0010                            NOT AT ALL PREPARED
005 T045303M (M          ) 0001                            MISSING

CONDITIONING VARIABLE ID:     TSUB0049
DESCRIPTION:                  NUMBER OF STUDENTS IN CLASS?
GRADES/ASSESSMENTS:           N04, S04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T044000                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          5

001 T044000A (01         ) 00000                           1-20 STUDENTS
002 T044000B (02         ) 10000                           21-25 STUDENTS
003 T044000C (03         ) 01000                           26-30 STUDENTS
004 T044000D (04         ) 00100                           31-35 STUDENTS
005 T044000E (05         ) 00010                           36 OR MORE STUDENTS
006 T044000M (M          ) 00001                           MISSING

CONDITIONING VARIABLE ID:     SCHL0087
DESCRIPTION:                  BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034201                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      4
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          3

001 C034201A (01         ) 000                             SELF-CONTAINED
002 C034201B (02         ) 100                             SEMI-DEPARTMENTALIZE
003 C034201C (03         ) 010                             DEPARTMENTALIZED
004 C034201M (M          ) 001                             MISSING

CONDITIONING VARIABLE ID:     SCHL0088
DESCRIPTION:                  ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034402                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 C034402Y (01         ) 00                              YES
002 C034402N (02         ) 10                              NO
003 C034402M (M          ) 01                              MISSING

CONDITIONING VARIABLE ID:     SCHL0089
DESCRIPTION:                  ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034403                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 C034403Y (01         ) 00                              YES
002 C034403N (02         ) 10                              NO
003 C034403M (M          ) 01                              MISSING

CONDITIONING VARIABLE ID:     SCHL0090
DESCRIPTION:                  ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034401                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 C034401Y (01         ) 00                              YES
002 C034401N (02         ) 10                              NO
003 C034401M (M          ) 01                              MISSING

CONDITIONING VARIABLE ID:     SCHL0091
DESCRIPTION:                  ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034406                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 C034406Y (01         ) 00                              YES
002 C034406N (02         ) 10                              NO
003 C034406M (M          ) 01                              MISSING

CONDITIONING VARIABLE ID:     SCHL0092
DESCRIPTION:                  HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C034510                     TOTAL NUMBER OF SPECIFIED CONTRASTS:      6
TYPE OF CONTRAST:             CLASS                       NUMBER OF INDEPENDENT CONTRASTS:          5

001 C034510A (01         ) 00000                           EVERY DAY
002 C034510B (02         ) 10000                           3 OR 4 TIMES A WEEK
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
003 C034510C (03          ) 01000
004 C034510D (04          ) 00100                  ONCE OR TWICE/WEEK
005 C034510E (05          ) 00010                  LESS THAN ONCE/WEEK
006 C034510M (M           ) 00001                  SUBJECT NOT TAUGHT
                                                   MISSING

CONDITIONING VARIABLE ID:   SCHL0093
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034511                TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         5

001 C034511A (01          ) 00000                  EVERY DAY
002 C034511B (02          ) 10000                  3 OR 4 TIMES A WEEK
003 C034511C (03          ) 01000                  ONCE OR TWICE/WEEK
004 C034511D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C034511E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C034511M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0094
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034512                TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         5

001 C034512A (01          ) 00000                  EVERY DAY
002 C034512B (02          ) 10000                  3 OR 4 TIMES A WEEK
003 C034512C (03          ) 01000                  ONCE OR TWICE/WEEK
004 C034512D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C034512E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C034512M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0095
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034513                TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         5

001 C034513A (01          ) 00000                  EVERY DAY
002 C034513B (02          ) 10000                  3 OR 4 TIMES A WEEK
003 C034513C (03          ) 01000                  ONCE OR TWICE/WEEK
004 C034513D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C034513E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C034513M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0096
DESCRIPTION:                HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034514                TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         5

001 C034514A (01          ) 00000                  EVERY DAY
002 C034514B (02          ) 10000                  3 OR 4 TIMES A WEEK
003 C034514C (03          ) 01000                  ONCE OR TWICE/WEEK
004 C034514D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C034514E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C034514M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0097
DESCRIPTION:                HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C031611                TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         2

001 C031611Y (01          ) 00                     YES
002 C031611N (02          ) 10                     NO
003 C031611M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0098
DESCRIPTION:                SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034601                TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:         2

001 C034601Y (01          ) 00                     YES
002 C034601N (02          ) 10                     NO
003 C034601M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0099
DESCRIPTION:                SCHOOL W/ SPECIAL FOCUS ON ENGLISH?
GRADES/ASSESSMENTS:         N08, S08, N12
CONDITIONING VAR LABEL:
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
NAEP ID:                     C037203              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037203Y (01        ) 0                       YES
002 C037203M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0100
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE ENGLISH CURRICULUM?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037306              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037306Y (01        ) 0                       YES
002 C037306M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0101
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039401              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039401Y (01        ) 0                       YES
002 C039401M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0102
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039402              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039402Y (01        ) 0                       YES
002 C039402M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0103
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039403              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039403Y (01        ) 0                       YES
002 C039403M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0104
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039404              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039404Y (01        ) 0                       YES
002 C039404M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0105
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039405              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039405Y (01        ) 0                       YES
002 C039405M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0106
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039406              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039406Y (01        ) 0                       YES
002 C039406M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0107
DESCRIPTION:                 8TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039501              TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039501Y (01        ) 0                       YES
002 C039501M (M         ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0108
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
DESCRIPTION:                 8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039502
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039502Y (01          ) 0                      YES
002 C039502M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0109
DESCRIPTION:                 8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039503
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039503Y (01          ) 0                      YES
002 C039503M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0110
DESCRIPTION:                 8TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039504
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039504Y (01          ) 0                      YES
002 C039504M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0111
DESCRIPTION:                 8TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039505
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039505Y (01          ) 0                      YES
002 C039505M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0112
DESCRIPTION:                 8TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039601
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039601Y (01          ) 0                      YES
002 C039601M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0113
DESCRIPTION:                 8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039602
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039602Y (01          ) 0                      YES
002 C039602M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0114
DESCRIPTION:                 8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039603
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039603Y (01          ) 0                      YES
002 C039603M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0115
DESCRIPTION:                 8TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039604
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039604Y (01          ) 0                      YES
002 C039604M (M           ) 1                      MISSING

CONDITIONING VARIABLE ID:    SCHL0116
DESCRIPTION:                 8TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039605
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1
001 C039605Y (01          ) 0                      YES
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
002 C039605M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0117
DESCRIPTION:               WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C041901                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 C041901A (01         ) 00000                     0%
002 C041901B (02         ) 10000                     1-2%
003 C041901C (03         ) 01000                     3-5%
004 C041901D (04         ) 00100                     6-10%
005 C041901E (05         ) 00010                     MORE THAN 10%
006 C041901M (M          ) 00001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0124
DESCRIPTION:               YRS TOTAL TAUGHT MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T063001                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        5

001 T063001A (01         ) 00000                     2 YEARS OR LESS
002 T063001B (02         ) 10000                     3-5 YEARS
003 T063001C (03         ) 01000                     6-10 YEARS
004 T063001D (04         ) 00100                     11-24 YEARS
005 T063001E (05         ) 00010                     25 YEARS OR MORE
006 T063001M (M          ) 00001                     MISSING

CONDITIONING VARIABLE ID:  TCHR0125
DESCRIPTION:               CURRICULUM SPECIALIST TO HELP/ADVISE IN MATH?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T058301                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 T058301Y (01         ) 00                        YES
002 T058301N (02         ) 10                        NO
003 T058301M (M          ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0118
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO MATH BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035002                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035002Y (01         ) 00                        YES
002 C035002N (02         ) 10                        NO
003 C035002M (M          ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0119
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035003                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035003Y (01         ) 00                        YES
002 C035003N (02         ) 10                        NO
003 C035003M (M          ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0120
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035006                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035006Y (01         ) 00                        YES
002 C035006N (02         ) 10                        NO
003 C035006M (M          ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0121
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO ARTS BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035007                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035007Y (01         ) 00                        YES
002 C035007N (02         ) 10                        NO
003 C035007M (M          ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0122
DESCRIPTION:               FROM 9TH ON HOW MANY YRS REQUIRED FOR MATH?
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040201                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040201A (01          ) 0000000                   NONE
002 C040201B (02          ) 1000000                   ONE HALF YEAR
003 C040201C (03          ) 0100000                   ONE YEAR
004 C040201D (04          ) 0010000                   TWO YEARS
005 C040201E (05          ) 0001000                   THREE YEARS
006 C040201F (06          ) 0000100                   FOUR YEARS
007 C040201G (07          ) 0000010                   MORE THAN FOUR YEARS
008 C040201M (M           ) 0000001                   MISSING

CONDITIONING VARIABLE ID:    SCHL0123
DESCRIPTION:                 FROM 9TH ON HOW MANY YRS REQUIRED FOR SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040202                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040202A (01          ) 0000000                   NONE
002 C040202B (02          ) 1000000                   ONE HALF YEAR
003 C040202C (03          ) 0100000                   ONE YEAR
004 C040202D (04          ) 0010000                   TWO YEARS
005 C040202E (05          ) 0001000                   THREE YEARS
006 C040202F (06          ) 0000100                   FOUR YEARS
007 C040202G (07          ) 0000010                   MORE THAN FOUR YEARS
008 C040202M (M           ) 0000001                   MISSING

CONDITIONING VARIABLE ID:    SCHL0124
DESCRIPTION:                 FROM 9TH ON HOW MANY YRS REQUIRED FOR ENG/LIT?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040203                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040203A (01          ) 0000000                   NONE
002 C040203B (02          ) 1000000                   ONE HALF YEAR
003 C040203C (03          ) 0100000                   ONE YEAR
004 C040203D (04          ) 0010000                   TWO YEARS
005 C040203E (05          ) 0001000                   THREE YEARS
006 C040203F (06          ) 0000100                   FOUR YEARS
007 C040203G (07          ) 0000010                   MORE THAN FOUR YEARS
008 C040203M (M           ) 0000001                   MISSING

CONDITIONING VARIABLE ID:    SCHL0125
DESCRIPTION:                 FROM 9TH ON HOW MANY YRS REQUIRED FINE/PERF ARTS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040204                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040204A (01          ) 0000000                   NONE
002 C040204B (02          ) 1000000                   ONE HALF YEAR
003 C040204C (03          ) 0100000                   ONE YEAR
004 C040204D (04          ) 0010000                   TWO YEARS
005 C040204E (05          ) 0001000                   THREE YEARS
006 C040204F (06          ) 0000100                   FOUR YEARS
007 C040204G (07          ) 0000010                   MORE THAN FOUR YEARS
008 C040204M (M           ) 0000001                   MISSING

CONDITIONING VARIABLE ID:    SCHL0126
DESCRIPTION:                 COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED BIO?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040301                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040301Y (01          ) 0                         YES
002 C040301M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0127
DESCRIPTION:                 COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED CHEM?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040302                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040302Y (01          ) 0                         YES
002 C040302M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0128
DESCRIPTION:                 COURSES 1 OR > SEMESTERS TAUGHT IN ADV PHYSICS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040303                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040303Y (01          ) 0                   YES
002 C040303M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0129
DESCRIPTION:                NO ADVANCED SCIENCE COURSES TAUGHT
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040304             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040304Y (01          ) 0                   YES
002 C040304M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0130
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN COMP SCI?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040305             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040305Y (01          ) 0                   YES
002 C040305M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0131
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN CALCULUS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040306             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040306Y (01          ) 0                   YES
002 C040306M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0132
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN TRIGONOMETRY?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040307             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040307Y (01          ) 0                   YES
002 C040307M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0133
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN PRECALCULUS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040308             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040308Y (01          ) 0                   YES
002 C040308M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0134
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN PROB/STAT?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040309             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040309Y (01          ) 0                   YES
002 C040309M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0135
DESCRIPTION:                COURSES 1 OR > SEMESTERS TAUGHT IN UNI/INTEG MATH?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040310             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040310Y (01          ) 0                   YES
002 C040310M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0136
DESCRIPTION:                NO ADVANCED MATH COURSES TAUGHT?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040311             TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:           CLASS               NUMBER OF INDEPENDENT CONTRASTS:       1

001 C040311Y (01          ) 0                   YES
002 C040311M (M           ) 1                   MISSING

CONDITIONING VARIABLE ID:   SCHL0137
DESCRIPTION:                STUDS REQUIRED TO PASS STATE TEST IN MATH?
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040401
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                     NUMBER OF INDEPENDENT CONTRASTS:        2
001 C040401Y (01          ) 00
002 C040401N (02          ) 10                       YES
003 C040401M (M           ) 01                       NO
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0138
DESCRIPTION:                 STUDS REQUIRED TO PASS STATE TEST IN SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040402
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                     NUMBER OF INDEPENDENT CONTRASTS:        2
001 C040402Y (01          ) 00
002 C040402N (02          ) 10                       YES
003 C040402M (M           ) 01                       NO
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0139
DESCRIPTION:                 STUDS REQUIRED TO PASS STATE TEST IN ENG/LANG ARTS
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040403
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                     NUMBER OF INDEPENDENT CONTRASTS:        2
001 C040403Y (01          ) 00
002 C040403N (02          ) 10                       YES
003 C040403M (M           ) 01                       NO
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0140
DESCRIPTION:                 STUDS REQUIRED TO PASS STATE TEST IN FINE/PERF ART
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040404
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                     NUMBER OF INDEPENDENT CONTRASTS:        2
001 C040404Y (01          ) 00
002 C040404N (02          ) 10                       YES
003 C040404M (M           ) 01                       NO
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0141
DESCRIPTION:                 SCHOOL SPONSER 12TH GR FIELD TRIPS FOR MATH?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040501
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1
001 C040501Y (01          ) 0
002 C040501M (M           ) 1                        YES
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0142
DESCRIPTION:                 SCHOOL SPONSER 12TH GR FIELD TRIPS FOR SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040502
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1
001 C040502Y (01          ) 0
002 C040502M (M           ) 1                        YES
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0143
DESCRIPTION:                 SCHOOL SPONSER 12TH GR FIELD TRIPS IN ENG/LANG ART
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040503
TYPE OF CONTRAST:            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1
001 C040503Y (01          ) 0
002 C040503M (M           ) 1                        YES
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0144
DESCRIPTION:                 SCHOOL SPONSER 12TH GR FIELD TRIPS IN ARTS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040504
TYPE OF CONTRAST.            CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1
001 C040504Y (01          ) 0
002 C040504M (M           ) 1                        YES
                                                     MISSING

CONDITIONING VARIABLE ID:    SCHL0145
DESCRIPTION:                 SCHOOL SPONSER 12TH GR FIELD TRIPS IN OTHER?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040505                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040505Y (01              ) 0                            YES
002 C040505M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0146
DESCRIPTION:                  SCHOOL SPONSER 12TH GR FIELD TRIPS IN NONE ABOVE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040506                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040506Y (01              ) 0                            YES
002 C040506M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0147
DESCRIPTION:                  12TH GRADERS IN EXTRACURR ACTS IN MATH?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040601                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040601Y (01              ) 0                            YES
002 C040601M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0148
DESCRIPTION:                  12TH GRADERS IN EXTRACURR ACTS IN SCIENCE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040602                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040602Y (01              ) 0                            YES
002 C040602M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0149
DESCRIPTION:                  12TH GRADERS IN EXTRACURR ACTS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040603                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040603Y (01              ) 0                            YES
002 C040603M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0150
DESCRIPTION:                  12TH GRADERS IN EXTRACURR ACTS IN ARTS?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040604                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040604Y (01              ) 0                            YES
002 C040604M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0151
DESCRIPTION:                  12TH GRADERS IN EXTRACURR ACTS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040605                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040605Y (01              ) 0                            YES
002 C040605M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0152
DESCRIPTION:                  12TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040701                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040701Y (01              ) 0                            YES
002 C040701M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0153
DESCRIPTION:                  12TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040702                        TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:             CLASS                          NUMBER OF INDEPENDENT CONTRASTS:         1

001 C040702Y (01              ) 0                            YES
002 C040702M (M               ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0154
DESCRIPTION:                  12TH GRADERS IN SUMMER PORGRAMS IN ENG/LANG ARTS?
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040703
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 C040703Y (01            ) 0                       YES
002 C040703M (M             ) 1                       MISSING

CONDITIONING VARIABLE ID:     SCHL0155
DESCRIPTION:                  12TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040704
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 C040704Y (01            ) 0                       YES
002 C040704M (M             ) 1                       MISSING

CONDITIONING VARIABLE ID:     SCHL0156
DESCRIPTION:                  12TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040705
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 C040705Y (01            ) 0                       YES
002 C040705M (M             ) 1                       MISSING

CONDITIONING VARIABLE ID:     SCHL0157
DESCRIPTION:                  # STUDS ENROLLED IN AP SCIENCE COURSES?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040801
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
                                                      NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040801A (01            ) 0000000                 NONE
002 C040801B (02            ) 1000000                 1-10
003 C040801C (03            ) 0100000                 11-25
004 C040801D (04            ) 0010000                 26-50
005 C040801E (05            ) 0001000                 51-75
006 C040801F (06            ) 0000100                 76-99
007 C040801G (07            ) 0000010                 100 OR MORE
008 C040801M (M             ) 0000001                 MISSING

CONDITIONING VARIABLE ID:     SCHL0158
DESCRIPTION:                  # STUDS ENROLLED IN AP CALCULUS COURSES?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040802
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
                                                      NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040802A (01            ) 0000000                 NONE
002 C040802B (02            ) 1000000                 1-10
003 C040802C (03            ) 0100000                 11-25
004 C040802D (04            ) 0010000                 26-50
005 C040802E (05            ) 0001000                 51-75
006 C040802F (06            ) 0000100                 76-99
007 C040802G (07            ) 0000010                 100 OR MORE
008 C040802M (M             ) 0000001                 MISSING

CONDITIONING VARIABLE ID:     SCHL0159
DESCRIPTION:                  # STUDS ENROLLED IN AP COMP SCI COURSES?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040803
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
                                                      NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040803A (01            ) 0000000                 NONE
002 C040803B (02            ) 1000000                 1-10
003 C040803C (03            ) 0100000                 11-25
004 C040803D (04            ) 0010000                 26-50
005 C040803E (05            ) 0001000                 51-75
006 C040803F (06            ) 0000100                 76-99
007 C040803G (07            ) 0000010                 100 OR MORE
008 C040803M (M             ) 0000001                 MISSING

CONDITIONING VARIABLE ID:     SCHL0160
DESCRIPTION:                  # STUDS ENROLLED IN AP ENGLISH COURSES?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040804
TYPE OF CONTRAST:             CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
                                                      NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040804A (01            ) 0000000                 NONE
002 C040804B (02            ) 1000000                 1-10
003 C040804C (03            ) 0100000                 11-25
004 C040804D (04            ) 0010000                 26-50
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
005 C040804E (05          ) 0001000                    51-75
006 C040804F (06          ) 0000100                    76-99
007 C040804G (07          ) 0000010                    100 OR MORE
008 C040804M (M           ) 0000001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0161
DESCRIPTION:                ANY 12TH GRDS TAKING COLLEGE COURSES IN MATH?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040901                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040901Y (01          ) 0                          YES
002 C040901M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:   SCHL0162
DESCRIPTION:                ANY 12TH GRDS TAKING COLLEGE COURSES IN SCIENCE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040902                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040902Y (01          ) 0                          YES
002 C040902M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:   SCHL0163
DESCRIPTION:                ANY 12TH GRDS TAKING COLLEGE COURSES ENG/LANG ARTS
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040903                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040903Y (01          ) 0                          YES
002 C040903M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:   SCHL0164
DESCRIPTION:                ANY 12TH GRDS TAKING COLLEGE COURSES IN ARTS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040904                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040904Y (01          ) 0                          YES
002 C040904M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:   SCHL0165
DESCRIPTION:                ANY 12TH GRDS TAKING COLLEGE COURSES IN NONE ABOVE
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C040905                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040905Y (01          ) 0                          YES
002 C040905M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:   SCHL0166
DESCRIPTION:                WHAT % 12TH GRDS HELD BACK AND REPEAT 12TH GRADE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C041001                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 C041001A (01          ) 00000                      0%
002 C041001B (02          ) 10000                      1-2%
003 C041001C (03          ) 01000                      3-5%
004 C041001D (04          ) 00100                      6-10%
005 C041001E (05          ) 00010                      MORE THAN 10%
006 C041001M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0167
DESCRIPTION:                LAST YR WHAT % OF 12TH GRDS GRADUATED?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C041101                    TOTAL NUMBER OF SPECIFIED CONTFASTS:    6
TYPE OF CONTRAST:           CLASS                      NUMBER OF INDEPENDENT CONTRASTS:        5

001 C041101A (01          ) 00000                      99-100%
002 C041101B (02          ) 10000                      95-98%
003 C041101C (03          ) 01000                      90-94%
004 C041101D (04          ) 00100                      75-89%
005 C041101E (05          ) 00010                      LESS THAN 75%
006 C041101M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:   SCHL0168
DESCRIPTION:                WHAT % OF GRADUATING CLASS NOW IN 2-YR COLLEGE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
NAEP ID:                    C036001              TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         6

001 C036001A (01          ) 000000               0-10%
002 C036001B (02          ) 100000               11-25%
003 C036001C (03          ) 010000               26-50%
004 C036001D (04          ) 001000               51-75%
005 C036001E (05          ) 000100               76-90%
006 C036001F (06          ) 000010               91-100%
007 C036001M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   SCHL0169
DESCRIPTION:                WHAT % OF GRADUATING CLASS NOW IN 4-YR COLLEGE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C036002              TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         6

001 C036002A (01          ) 000000               0-10%
002 C036002B (02          ) 100000               11-25%
003 C036002C (03          ) 010000               26-50%
004 C036002D (04          ) 001000               51-75%
005 C036002E (05          ) 000100               76-90%
006 C036002F (06          ) 000010               91-100%
007 C036002M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   SCHL0170
DESCRIPTION:                WHAT % OF GRADUATING CLASS NOW IN VO-TEC SCHOOL?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C036003              TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         6

001 C036003A (01          ) 000000               0-10%
002 C036003B (02          ) 100000               11-25%
003 C036003C (03          ) 010000               26-50%
004 C036003D (04          ) 001000               51-75%
005 C036003E (05          ) 000100               76-90%
006 C036003F (06          ) 000010               91-100%
007 C036003M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   SCHL0171
DESCRIPTION:                WHAT % OF GRAD CLASS NOW IN EMPLOYER TRAINING?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C036004              TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         6

001 C036004A (01          ) 000000               0-10%
002 C036004B (02          ) 100000               11-25%
003 C036004C (03          ) 010000               26-50%
004 C036004D (04          ) 001000               51-75%
005 C036004E (05          ) 000100               76-90%
006 C036004F (06          ) 000010               91-100%
007 C036004M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   SCHL0172
DESCRIPTION:                % OF GRADUATING CLASS NOW IN MILITARY SERVICE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    C036005              TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         6

001 C036005A (01          ) 000000               0-10%
002 C036005B (02          ) 100000               11-25%
003 C036005C (03          ) 010000               26-50%
004 C036005D (04          ) 001000               51-75%
005 C036005E (05          ) 000100               76-90%
006 C036005F (06          ) 000010               91-100%
007 C036005M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   SCHL0173
DESCRIPTION:                PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    NTLUNSC              TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:         1

001 NATLUNCM (M           ) 0                    MISSING
002 NATLUNCH (@           ) 1                    PERCENT

CONDITIONING VARIABLE ID:   SCHL0174
DESCRIPTION:                PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:         N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    NTLUNSC              TOTAL NUMBER OF SPECIFIED CONTRASTS:     1
TYPE OF CONTRAST:           LINEAR               NUMBER OF INDFPENDENT CONTRASTS:         1
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
001 NATLUNCL (0-100,M=0  )  0.0 + 1.0*X                  LINEAR

CONDITIONING VARIABLE ID:  SCHL0175
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMREADM (M          ) 0                        MISSING
002 REM READ (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0176
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMREADL (0-100,M=0  )  0.0 + 1.0*X             LINEAR

CONDITIONING VARIABLE ID:  SCHL0177
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMMATHM (M          ) 0                        MISSING
002 REM MATH (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0178
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMMATHL (0-100,M=0  )  0.0 + 1.0*X             LINEAR

CONDITIONING VARIABLE ID:  SCHL0179
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 NATLUN4M (M          ) 0                        MISSING
002 NATLUN4  (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0180
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 NATLUN4L (0-100,M=0  )  0.0 + 1.0*X             LINEAR

CONDITIONING VARIABLE ID:  SCHL0181
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMREA4M (M          ) 0                        MISSING
002 REMREAD4 (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0182
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMREA4L (0-100,M=0  )  0.0 + 1.0*X             LINEAR

CONDITIONING VARIABLE ID:  SCHL0183
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMMAT4M (M          ) 0                        MISSING
```

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Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
002 REMMATH4 (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0184
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT4L (0-100,M=0  )  0.0 +  1.0*X            LINEAR

CONDITIONING VARIABLE ID:  SCHL0185
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN8M (M          ) 0                        MISSING
002 NATLUN8  (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0186
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLUN8L (0-100,M=0  )  0.0 +  1.0*X            LINEAR

CONDITIONING VARIABLE ID:  SCHL0187
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA8M (M          ) 0                        MISSING
002 REMREAD8 (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0188
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMREA8L (0-100,M=0  )  0.0 +  1.0*X            LINEAR

CONDITIONING VARIABLE ID:  SCHL0189
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8M (M          ) 0                        MISSING
002 REMMATH8 (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0190
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8L (0-100,M=0  )  0.0 +  1.0*X            LINEAR

CONDITIONING VARIABLE ID:  SCHL0190
DESCRIPTION:               RCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLU12M (M          ) 0                        MISSING
002 NATLUN12 (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0191
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLU12L (0-100,M=0  )  0.0 +  1.0*X            LINEAR
```

Table C-4 (continued)

Conditioning Variables Specific to the 1996 Mathematics Assessment

```
CONDITIONING VARIABLE ID:  SCHL0192
DESCRIPTION:               RCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMRD12M (M          ) 0                        MISSING
002 REMRD12  (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0193
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMRD12L (0-100,M=0  )  0.0 +  1.0*X            LINEAR

CONDITIONING VARIABLE ID:  SCHL0194
DESCRIPTION:               RCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMMH12M (M          ) 0                        MISSING
002 REMMH12  (@          ) 1                        PERCENT

CONDITIONING VARIABLE ID:  SCHL0195
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 REMMH12L (0-100,M=0  )  0.0 +  1.0*X            LINEAR
```

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Table C-5

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VARIABLE ID:  BACK0001
DESCRIPTION:               GRAND MEAN
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    OVERALL
NAEP ID:                   BKSER
TYPE OF CONTRAST:          OTHER                TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                NUMBER OF INDEPENDENT CONTRASTS:        1

001 OVERALL  (@         ) 1                     GRAND MEAN

CONDITIONING VARIABLE ID:  BACK0002
DESCRIPTION:               DERIVED SEX
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    GENDER
NAEP ID:                   DSEX
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                NUMBER OF INDEPENDENT CONTRASTS:        1

001 MALE     (1         ) 0                     MALE
002 FEMALE   (2         ) 1                     FEMALE

CONDITIONING VARIABLE ID:  BACK0003
DESCRIPTION:               DERIVED RACE/ETHNICITY
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/ETH
NAEP ID:                   DRACE
TYPE OF CONTRAST:          CLASS                TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                NUMBER OF INDEPENDENT CONTRASTS:        3

001 WHI/AI/O (1,5,6     ) 000                   RACE/ETHNICITY:  WHITE, AMERICAN INDIAN/ALASKAN
                                                NATIVE, OTHER, MISSING, UNCLASSIFIED
002 BLACK    (2         ) 100                   RACE/ETHNICITY:  BLACK
003 HISPANIC (3         ) 010                   RACE/ETHNICITY:  HISPANIC
004 ASIAN    (4         ) 001                   RACE/ETHNICITY:  ASIAN

CONDITIONING VARIABLE ID:  BACK0004
DESCRIPTION:               IF HISPANIC, WHAT IS YOUR HISPANIC BACKGROUND?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    HISPANIC
NAEP ID:                   B003101              TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:        4

001 NOT HISP (1         ) 0000                  HISPANIC:  NOT HISPANIC
002 MEXICAN  (2         ) 1000                  HISPANIC:  MEXICAN, MEXICAN AMERICAN, CHICANO
003 PUER RIC (3         ) 0100                  HISPANIC:  PUERTO RICAN
004 CUBN,OTH (4,5       ) 0010                  HISPANIC:  CUBAN, OTHER
005 HISP-?   (M         ) 0001                  HISPANIC:  MISSING

CONDITIONING VARIABLE ID:  BACK0005
DESCRIPTION:               MSA/NON-MSA
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    MSANAT
NAEP ID:                   TOL8                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:        1

001 MSA      (1,2,3,4,7,9) 0                    MSA
002 NON MSA  (5,6,8      ) 1                    NON-MSA

CONDITIONING VARIABLE ID:  BACK0006
DESCRIPTION:               TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    TOL5
NAEP ID:                   TOL5                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:        4

001 BIG CTY5 (1         ) 0000                  TOL5:  LARGE CITY
002 MID CTY5 (2,M       ) 1000                  TOL5:  MID-SIZE CITY
003 FR/BTWN5 (3         ) 0100                  TOL5:  URBAN FRINGE OF LARGE CITY, URBAN FRINGE OF
                                                MID-SIZE CITY
004 SML TWN5 (4         ) 0010                  TOL5:  SMALL TOWN
005 RURAL5   (5         ) 0001                  TOL5:  RURAL (MSA AND NON-MSA)

CONDITIONING VARIABLE ID:  BACK0007
DESCRIPTION:               DESCRIPTION OF COMMUNITY
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    DOC
NAEP ID:                   DOC                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                NUMBER OF INDEPENDENT CONTRASTS:        3

001 BIG CITY (1         ) 000                   DOC:  BIG CITY
002 URBAN FR (2         ) 100                   DOC:  URBAN FRINGE
003 MED CITY (3,9,M     ) 010                   DOC:  MEDIUM CITY
004 SM PLACE (4         ) 001                   DOC:  SMALL PLACE

CONDITIONING VARIABLE ID:  BACK0008
DESCRIPTION:               PARENTS' HIGHEST LEVEL OF EDUCATION
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    PARED
NAEP ID:                   PARED                TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 < HS      (1          ) 0000                    PARED:  LESS THAN HIGH SCHOOL
002 HS GRAD   (2          ) 1000                    PARED:  HIGH SCHOOL GRADUATE
003 POST HS   (3          ) 0100                    PARED:  POST HIGH SCHOOL
004 COL GRAD  (4          ) 0010                    PARED:  COLLEGE GRADUATE
005 PARED-?   (5,M        ) 0001                    PARED:  MISSING, I DON'T KNOW

CONDITIONING VARIABLE ID:    BACK0009
DESCRIPTION:                 REGION OF THE COUNTRY
GRADES/ASSESSMENTS:          N04, N08, N12
CONDITIONING VAR LABEL:      REGION
NAEP ID:                     REGION                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        3

001 N EAST    (1          ) 000                     REGION:  NORTHEAST
002 S EAST    (2          ) 100                     REGION:  SOUTHEAST
003 CENTRAL   (3          ) 010                     REGION:  CENTRAL
004 WEST      (4,5        ) 001                     REGION:  WEST, TERRITORIES (NONE)

CONDITIONING VARIABLE ID:    BACK0010
DESCRIPTION:                 SCHOOL TYPE (PQ)
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      SCHTYPE
NAEP ID:                     SCHTYPE                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 PUBLIC    (1          ) 00                      SCHOOL TYPE:  PUBLIC
002 PRIVATE   (2,4,5,M    ) 10                      SCHOOL TYPE:  PRIVATE, BUREAU OF INDIAN AFFAIRS,
                                                    DEPARTMENT OF DEFENSE, MISSING
003 CATHOLIC  (3          ) 01                      SCHOOL TYPE:  CATHOLIC

CONDITIONING VARIABLE ID:    BACK0011
DESCRIPTION:                 INDIVIDUALIZED EDUCATION PROGRAM
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      IEP
NAEP ID:                     IEP                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 IEP-YES   (1          ) 0                       IEP:  YES
002 IEP-NO    (2          ) 1                       IEP:  NO

CONDITIONING VARIABLE ID:    BACK0012
DESCRIPTION:                 LIMITED ENGLISH PROFICIENCY
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      LEP
NAEP ID:                     LEP                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 LEP-YES   (1          ) 0                       LEP:  YES
002 LEP-NO    (2          ) 1                       LEP:  NO

CONDITIONING VARIABLE ID:    BACK0013
DESCRIPTION:                 CHAPTER 1 (BOOK COVER)
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      CHAPTER1
NAEP ID:                     CHAP1                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 CHAP1-Y   (1          ) 0                       CHAPTER 1:  YES
002 CHAP1-N   (2          ) 1                       CHAPTER 1:  NO

CONDITIONING VARIABLE ID:    BACK0014
DESCRIPTION:                 DO YOU RECEIVE A FREE OR REDUCED-PRICE LUNCH?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      LUNCH
NAEP ID:                     SLUNCH                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        4

001 NOT ELIG  (1          ) 0000                    LUNCH PROGRAM:  NOT ELIGIBLE
002 REDUCED   (2          ) 1000                    LUNCH PROGRAM:  REDUCED PRICE
003 FREE      (3          ) 0100                    LUNCH PROGRAM:  FREE
004 INFO NA   (4,M        ) 0010                    LUNCH PROGRAM:  INFO NOT AVAILABLE
005 SCH REF   (5          ) 0001                    LUNCH PROGRAM:  SCHOOL REFUAL

CONDITIONING VARIABLE ID:    BACK0015
DESCRIPTION:                 HOW OFTEN DO THE PEOPLE IN YOUR HOME SPEAK A LANGUAGE OTHER THAN ENGLISH?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      HOMELANG
NAEP ID:                     B003201                TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        3

001 HL-NEVER  (1          ) 000                     HOMELANG:  NEVER
002 HL-SOME   (2          ) 100                     HOMELANG:  SOMETIMES
003 HL-ALWAY  (3          ) 010                     HOMELANG:  ALWAYS
004 HL-?      (M          ) 001                     HOMELANG:  MISSING
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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CONDITIONING VARIABLE ID:  BACK0016
DESCRIPTION:               HOW MUCH TV/VIDEO DO YOU USUALLY WATCH EACH DAY? (LINEAR)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    TVWATCHL
NAEP ID:                   B009001                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 TVLIN-0  (1          ) 0                        TV WATCHING (LINEAR) (0 TO 6+ HOURS PER DAY)
002 TVLIN-1  (2          ) 1                        TV WATCHING (LINEAR)
003 TVLIN-2  (3          ) 2                        TV WATCHING (LINEAR)
004 TVLIN-3  (4,M        ) 3                        TV WATCHING (LINEAR)
005 TVLIN-4  (5          ) 4                        TV WATCHING (LINEAR)
006 TVLIN-5  (6          ) 5                        TV WATCHING (LINEAR)
007 TVLIN-6  (7          ) 6                        TV WATCHING (LINEAR)

CONDITIONING VARIABLE ID:  BACK0017
DESCRIPTION:               HOW MUCH TV/VIDEO DO YOU USUALLY WATCH EACH DAY? (QUADRATIC)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    TVWATCHQ
NAEP ID:                   B009001                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          QUADRATIC                NUMBER OF INDEPENDENT CONTRASTS:        1

001 TV-QUAD  (1-7,M=4    )  1.0 + -2.0*X +  1.0*X**2   TV WATCHING (QUADRATIC)

CONDITIONING VARIABLE ID:  BACK0018
DESCRIPTION:               HOMEWORK ASSIGNED?:  BASED ON TIME SPENT ON HOMEWORK EACH DAY.
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    HWASSIGN
NAEP ID:                   B006601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 HW-MISS  (M          ) 00                       HOMEWORK ASSIGNED?:  MISSING
002 HW-NO    (1          ) 10                       HOMEWORK ASSIGNED?:  NO
003 HW-YES   (2-5        ) 01                       HOMEWORK ASSIGNED?:  YES

CONDITIONING VARIABLE ID:  BACK0019
DESCRIPTION:               HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY? (LINEAR)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEWRKL
NAEP ID:                   B006601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          LINEAR                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 HWLIN-0  (1,2,M      ) 0                        HOMEWORK (LINEAR):  DON'T HAVE ANY, DON'T DO ANY,
                                                    MISSING
002 HWLIN-1  (3          ) 1                        HOMEWORK (LINEAR):  1/2 HOUR OR LESS
003 HWLIN-2  (4          ) 2                        HOMEWORK (LINEAR):  1 HOUR
004 HWLIN-3  (5          ) 3                        HOMEWORK (LINEAR):  MORE THAN 1 HOUR

CONDITIONING VARIABLE ID:  BACK0020
DESCRIPTION:               HOW MUCH TIME DO YOU USUALLY SPEND ON HOMEWORK EACH DAY (QUADRATIC)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEWRKQ
NAEP ID:                   B006601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          SCALE                    NUMBER OF INDEPENDENT CONTRASTS:        1

001 HWQUAD-0 (1,2,M      ) 0                        HOMEWORK (QUADRATIC):  DON'T HAVE ANY, DON'T DO
                                                    ANY, MISSING
002 HWQUAD-1 (3          ) 1                        HOMEWORK (QUADRATIC):  1/2 HOUR OR LESS
003 HWQUAD-2 (4          ) 4                        HOMEWORK (QUADRATIC):  1 HOUR
004 HWQUAD-3 (5          ) 9                        HOMEWORK (QUADRATIC):  MORE THAN 1 HOUR

CONDITIONING VARIABLE ID:  BACK0021
DESCRIPTION:               HOURS EXTRA READING/WK, NOT CONNECTED W/ SCHOOL?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   B009101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        7

001 NONE      (01        ) 0000000                  NONE
002 1-2 HRS   (02        ) 1000000                  1-2 HOURS
003 3-4 HRS   (03        ) 0100000                  3-4 HOURS
004 5-6 HRS   (04        ) 0010000                  5-6 HOURS
005 7-8 HRS   (05        ) 0001000                  7-8 HOURS
006 9-10 HRS  (06        ) 0000100                  9-10 HOURS
007 > 10 HRS  (07        ) 0000010                  MORE THAN 10 HOURS
008 B009101M  (M         ) 0000001                  MISSING

CONDITIONING VARIABLE ID:  BACK0022
DESCRIPTION:               NUMBER OF ITEMS IN THE HOME (NEWSPAPER, > 25 BOOKS, ENCYCLOPEDIA, MAGAZINES)
                           (DERIVED)
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    HOMEITMS
NAEP ID:                   HOMEEN3                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 HITEM<=2 (1,M        ) 00                       ITEMS IN HOME:  ZERO TO TWO ITEMS, MISSING
002 HITEM=3  (2          ) 10                       ITEMS IN HOME:  THREE ITEMS
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
003 HITEM=4  (3          ) 01                  ITEMS IN HOME:  FOUR ITEMS

CONDITIONING VARIABLE ID:  BACK0023
DESCRIPTION:               HOW MANY DAYS OF SCHOOL MISSED LAST MONTH?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    SCH MISS
NAEP ID:                   S004001             TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         1

001 MISS->2  (3,4,5,M    ) 0                   DAYS OF SCHOOL MISSED:  3-4, 5-10, 10 OR MORE
                                               DAYS, MISSING
002 MISS-2<  (1,2        ) 1                   DAYS OF SCHOOL MISSED:  0-1, 2 DAYS

CONDITIONING VARIABLE ID:  BACK0024
DESCRIPTION:               HOW MANY GRADES IN THIS STATE (4)
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   B007602             TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         4

001 < ONE GR (01         ) 0000                LESS THAN ON GRADE
002 1-2 GRDS (02         ) 1000                1-2 GRADES
003 3-5 GRDS (03         ) 0100                3 -5 GRADES
004 > 5 GRDS (04         ) 0010                5 OR MORE GRADESEVER
005 MISSING  (M          ) 0001                MISSING

CONDITIONING VARIABLE ID:  BACK0025
DESCRIPTION:               SINCE 1ST GR, NOT PROMOTION, HOW OFTEN DIFF SCHLS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   B010101             TOTAL NUMBER OF SPECIFIED CONTRASTS:     9
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         8

001 B010101A (01         ) 00000000            NONE
002 B010101B (02         ) 10000000            1
003 B010101C (03         ) 01000000            2
004 B010101D (04         ) 00100000            3
005 B010101E (05         ) 00010000            4
006 B010101F (06         ) 00001000            5
007 B010101G (07         ) 00000100            6
008 B010101H (08         ) 00000010            7 OR MOREMORE
009 B010101M (M          ) 00000001            MISSING

CONDITIONING VARIABLE ID:  BACK0026
DESCRIPTION:               HOW LONG LIVED IN THE UNITED STATES?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    YRSINUSA
NAEP ID:                   B008001             TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         4

001 AALL LIF (1          ) 0000                ALL MY LIFE
002 USA >5   (2          ) 1000                LIVED IN US MORE THAN 5 YEARS
003 USA 3-5  (3          ) 0100                LIVED IN US 3-5 YEARS
004 USA <3   (4          ) 0010                LIVED IN US LESS THAN 3 YEARS
005 USA-?    (M          ) 0001                LIVED IN US MISSING

CONDITIONING VARIABLE ID:  BACK0027
DESCRIPTION:               HOW MANY GRADES IN THIS STATE? (4TH GRADE)
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:    STGRADE4
NAEP ID:                   B007601             TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         2

001 STGRD<1  (1,M        ) 00                  GRADES IN STATE:  LESS THAN 1 GRADE, MISSING
002 STGRD1-2 (2          ) 10                  GRADES IN STATE:  1-2 GRADES
003 STGRD3>  (3          ) 01                  GRADES IN STATE:  3 OR MORE GRADES

CONDITIONING VARIABLE ID:  BACK0029
DESCRIPTION:               TIMES CHANGED SCHOOL SINCE FIRST GRADE
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B007302             TOTAL NUMBER OF SPECIFIED CONTRASTS:     9
TYPE OF CONTRAST:          CLASS               NUMBER OF INDEPENDENT CONTRASTS:         8

001 B007302A (01         ) 00000000            NONE
002 B007302B (02         ) 10000000            1
003 B007302C (03         ) 01000000            2
004 B007302D (04         ) 00100000            3
005 B007302E (05         ) 00010000            4
006 B007302F (06         ) 00001000            5
007 B007302G (07         ) 00000100            6
008 B007302H (08         ) 00000010            7 OR MORE
009 B007302M (M          ) 00000001            MISSING

CONDITIONING VARIABLE ID:  BACK0030
DESCRIPTION:               HOW MANY GRADES IN THIS STATE (12TH GRADE)
GRADES/ASSESSMENTS:        N12
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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CONDITIONING VAR LABEL:     STGRAD12
NAEP ID:                    B008301
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 STGRD<1  (1,M        ) 000                     GRADES IN STATE:  LESS THAN 1 GRADE, MISSING
002 STGRD1-2 (2          ) 100                     GRADES IN STATE:  1-2 GRADES
003 STGRD3-5 (3          ) 010                     GRADES IN STATE:  3-5 GRADES
004 STGRD6>  (4,5        ) 001                     GRADES IN STATE:  MORE THAN 5 GRADES

CONDITIONING VARIABLE ID:   SCHL0001
DESCRIPTION:                SCHOOL LEVEL AVERAGE SCIENCE NORMIT (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:     SCH NORM
NAEP ID:                    SCHNORM
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 SCHNRM-? (M          ) 0                       SCHOOL LEVEL AVERAGE SCIENCE NORMIT MISSING
002 SCHNRM-Y (@          ) 1                       SCHOOL LEVEL AVERAGE SCIENCE NORMIT NOT-MISSING

CONDITIONING VARIABLE ID:   SCHL0002
DESCRIPTION:                SCHOOL LEVEL AVERAGE SCIENCE NORMIT
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:     SNRM-LIN
NAEP ID:                    SCHNORM
TYPE OF CONTRAST:           SCALE                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 SNRM-LIN (*          ) (F8.4)                  SCHOOL LEVEL AVERAGE SCIENCE NORMIT MEAN
002 SNRM-LIN (M          ) 0                       SCHOOL LEVEL AVERAGE SCIENCE NORMIT MISSING

CONDITIONING VARIABLE ID:   BACK0028
DESCRIPTION:                TIMES CHANGED SCHLS SINCE 1ST GR; NOT PROMOTIONS?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    B009201
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 B009201A (01         ) 0000                    NONE
002 B009201B (02         ) 1000                    1
003 B009201C (03         ) 0100                    2
004 B009201D (04         ) 0010                    3 OR GREATER
005 B009201M (M          ) 0001                    MISSING

CONDITIONING VARIABLE ID:   BACK0031
DESCRIPTION:                HOW OFTEN DO YOU DISCUSS THINGS STUDIED IN SCHOOL WITH SOMEONE AT HOME?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:     DISC@HOM
NAEP ID:                    B007401
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
                                                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 DIS@HOM1 (1          ) 000                     DISCUSS STUDIES AT HOME:  ALMOST EVERY DAY
002 DIS@HOM2 (2          ) 100                     DISCUSS STUDIES AT HOME:  ONCE OR TWICE A WEEK
003 DIS@HOM3 (3          ) 010                     DISCUSS STUDIES AT HOME:  ONCE OR TWICE A MONTH
004 DIS@HOM4 (4,M        ) 001                     DISCUSS STUDIES AT HOME:  NEVER OR HARDLY EVER,
                                                   MISSING

CONDITIONING VARIABLE ID:   BACK0032
DESCRIPTION:                HOW OFTEN USE A HOME COMPUTER FOR SCHOOLWORK?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    B009301
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 DAILY    (01         ) 00000                   ALMOST EVERY DAY
002 1-2 WEEK (02         ) 10000                   ONCE OR TWICE A WEEK
003 1-2 MTH  (03         ) 01000                   ONCE OR TWICE A MTH
004 NEVER    (04         ) 00100                   NEVER OR HARDLY EVER
005 NO COMP  (05         ) 00010                   NO COMPUTER AT HOME
006 MISSING  (M          ) 00001                   MISSING

CONDITIONING VARIABLE ID:   BACK0033
DESCRIPTION:                ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:     PGSREAD1
NAEP ID:                    B001101
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 PGS<6,?  (5,M        ) 0                       PAGES READ:  5 OR FEWER A DAY, MISSING
002 PGS>5    (1,2,3,4    ) 1                       PAGES READ:  6-10, 11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID:   BACK0034
DESCRIPTION:                ABOUT HOW MANY PAGES A DAY DO YOU HAVE TO READ FOR SCHOOL AND HOMEWORK?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:     PGSREAD2
NAEP ID:                    B001101
TYPE OF CONTRAST:           CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 PGS<11,? (4,5,M      ) 0                       PAGES READ:  6-10, 5 OR FEWER A DAY, MISSING
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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002 PGS>10   (1,2,3       ) 1                    PAGES READ:  11-15, 16-20, 20 OR MORE

CONDITIONING VARIABLE ID:  BACK0035
DESCRIPTION:               WHICH BEST DESCRIBES YOUR HIGH-SCHOOL PROGRAM?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    HS PROG
NAEP ID:                   B008501               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 GENERAL   (1          ) 0000                 HIGH SCHOOL PROGRAM:  GENERAL
002 ACADEMIC  (2          ) 1000                 HIGH SCHOOL PROGRAM:  ACADEMIC/COLLEGE PREP
003 VOC/TECH  (3          ) 0100                 HIGH SCHOOL PROGRAM:  VOCATIONAL OR TECHNICAL
004 OTHERPGM  (4          ) 0010                 HIGH SCHOOL PROGRAM:  OTHER
005 HS PGM-?  (M          ) 0001                 HIGH SCHOOL PROGRAM:  MISSING

CONDITIONING VARIABLE ID:  BACK0036
DESCRIPTION:               SEMESTERS ENGLISH/LITERATURE/WRITING (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM ENG
NAEP ID:                   B007101               TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        1

001 SEMENG-?  (M          ) 0                    ENGLISH SEMESTERS:  MISSING
002 SEMENG-^  (1-9        ) 1                    ENGLISH SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0037
DESCRIPTION:               NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #ENG-LIN
NAEP ID:                   B007101               TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                NUMBER OF INDEPENDENT CONTRASTS:        1

001 #ENG-LIN  (1-9,M=0    )  0.0 +  1.0*X        NUMBER OF SEMESTERS ENGLISH/LITERATURE/WRITING
(LINEAR)

CONDITIONING VARIABLE ID:  BACK0038
DESCRIPTION:               SEMESTERS MATHEMATICS (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM MAT
NAEP ID:                   B007102               TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        1

001 SEMMAT-?  (M          ) 0                    MATH SEMESTERS:  MISSING
002 SEMMAT-^  (1-9        ) 1                    MATH SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0039
DESCRIPTION:               NUMBER OF SEMESTERS MATHEMATICS (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #MAT-LIN
NAEP ID:                   B007102               TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                NUMBER OF INDEPENDENT CONTRASTS:        1

001 #MAT-LIN  (1-9,M=0    )  0.0 +  1.0*X        NUMBER OF SEMESTERS MATHEMATICS (LINEAR)

CONDITIONING VARIABLE ID:  BACK0040
DESCRIPTION:               SEMESTERS SCIENCE (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM SCI
NAEP ID:                   B007103               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 SEMSCI-?  (M          ) 0000                 SCIENCE SEMESTERS:  MISSING
002 SEMSCI-^  (1,2,3      ) 1000                 SCIENCE SEMESTERS:  ZERO TO 2
003 SEMSCI-^  (4,5        ) 0100                 SCIENCE SEMESTERS:  3 OR 4
004 SEMSCI-^  (6,7        ) 0010                 SCIENCE SEMESTERS:  5 OR 6
005 SEMSCI-^  (8,9        ) 0001                 SCIENCE SEMESTERS:  7 OR MORE

CONDITIONING VARIABLE ID:  BACK0041
DESCRIPTION:               NUMBER OF SEMESTERS SCIENCE (LINEAR)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    #SCI-LIN
NAEP ID:                   B007103               TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                NUMBER OF INDEPENDENT CONTRASTS:        1

001 #SCI-LIN  (1-9,M=0    )  0.0 +  1.0*X        NUMBER OF SEMESTERS SCIENCE (LINEAR)

CONDITIONING VARIABLE ID:  BACK0042
DESCRIPTION:               SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SEM HIS
NAEP ID:                   B007104               TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        1

001 SEMHIS-?  (M          ) 0                    HISTORY SEMESTERS:  MISSING
002 SEMHIS-^  (1-9        ) 1                    HISTORY SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:  BACK0043
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 NUMBER OF SEMESTERS HISTORY/SOCIAL STUDIES/GEOGRAPHY (LINEAR)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      #HIS-LIN
NAEP ID:                     B007104
TYPE OF CONTRAST:            LINEAR                TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 #HIS-LIN (1-9,M=0    )  0.0 +  1.0*X           NUMBER OF SEMESTERS HISTORY/SOCIAL
                                                   STUDIES/GEOGRAPHY (LINEAR)

CONDITIONING VARIABLE ID:    BACK0044
DESCRIPTION:                 SEMESTERS FOREIGN LANGUAGES (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      SEM FLG
NAEP ID:                     B007105
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 SEMFLG-? (M          ) 0                       FOREIGN LANGUAGE SEMESTERS:  MISSING
002 SEMFLG-^ (1-9        ) 1                       FOREIGN LANGUAGE SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:    BACK0045
DESCRIPTION:                 NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      #FLG-LIN
NAEP ID:                     B007105
TYPE OF CONTRAST:            LINEAR                TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 #FLG-LIN (1-9,M=0    )  0.0 +  1.0*X           NUMBER OF SEMESTERS FOREIGN LANGUAGES (LINEAR)

CONDITIONING VARIABLE ID:    BACK0046
DESCRIPTION:                 SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      SEM VOC
NAEP ID:                     B007106
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 SEMVOC-? (M          ) 0                       VOC/TECH SEMESTERS:  MISSING
002 SEMVOC-^ (1-9        ) 1                       VOC/TECH SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:    BACK0047
DESCRIPTION:                 NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS EDUCATION (LINEAR)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      #VOC-LIN
NAEP ID:                     B007106
TYPE OF CONTRAST:            LINEAR                TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 #VOC-LIN (1-9,M=0    )  0.0 +  1.0*X           NUMBER OF SEMESTERS VOCATIONAL/TECHNICAL/BUSINESS
                                                   EDUCATION (LINEAR)

CONDITIONING VARIABLE ID:    BACK0048
DESCRIPTION:                 SEMESTERS ART/MUSIC (MISSING VS NON-MISSING)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      SEM ART
NAEP ID:                     B007107
TYPE OF CONTRAST:            CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 SEMART-? (M          ) 0                       ART/MUSIC SEMESTERS:  MISSING
002 SEMART-^ (1-9        ) 1                       ART/MUSIC SEMESTERS:  NOT MISSING

CONDITIONING VARIABLE ID:    BACK0049
DESCRIPTION:                 NUMBER OF SEMESTERS ART/MUSIC (LINEAR)
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:      #ART-LIN
NAEP ID:                     B007107
TYPE OF CONTRAST:            LINEAR                TOTAL NUMBER OF SPECIFIED CONTRASTS:   1
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 #ART-LIN (1-9,M=0    )  0.0 +  1.0*X           NUMBER OF SEMESTERS ART/MUSIC (LINEAR)

CONDITIONING VARIABLE ID:    SUBJ0001
DESCRIPTION:                 WHAT KIND OF SCI CLASS ARE YOU TAKING THIS YEAR?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     SCITAKE               TOTAL NUMBER OF SPECIFIED CONTRASTS:   7
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       6

001 NO SCIEN (01         ) 000000                  NOT TAKING THIS YEAR
002 LIFESCI  (02         ) 100000                  LIFE SCIENCE
003 PHYSSCI  (03         ) 010000                  PHYSICAL SCIENCE
004 EATHSCI  (04         ) 001000                  EARTH SCIENCE
005 GEN SCI  (05         ) 000100                  GENERAL SCIENCE
006 INTESCI  (06         ) 000010                  INTEGRATED SCIENCE
007 MISSING  (M          ) 000001                  MISSING

CONDITIONING VARIABLE ID:    BACK0050
DESCRIPTION:                 INTERACTION:  GENDER BY RACE/ETHNICITY
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      GEND/RAC
NAEP ID:                     N/A                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   8
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:            INTERACTION              NUMBER OF INDEPENDENT CONTRASTS:         3

001 G/R 11    (11          ) 010101                   GEND/RAC INTACT: 1. MALE      1. WHI/AI/O
002 G/R 12    (12          ) -10000                   GEND/RAC INTACT: 1. MALE      2. BLACK
003 G/R 13    (13          ) 00-100                   GEND/RAC INTACT: 1. MALE      3. HISPANIC
004 G/R 14    (14          ) 0000-1                   GEND/RAC INTACT: 1. MALE      4. ASIAN
005 G/R 21    (21          ) -1-1-1                   GEND/RAC INTACT: 2. FEMALE    1. WHI/AI/O
006 G/R 22    (22          ) 010000                   GEND/RAC INTACT: 2. FEMALE    2. BLACK
007 G/R 23    (23          ) 000100                   GEND/RAC INTACT: 2. FEMALE    3. HISPANIC
008 G/R 24    (24          ) 000001                   GEND/RAC INTACT: 2. FEMALE    4. ASIAN

CONDITIONING VARIABLE ID:    BACK0051
DESCRIPTION:                 INTERACTION:  GENDER BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      GEND/TOL
NAEP ID:                     N/A                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    10
TYPE OF CONTRAST:            INTERACTION              NUMBER OF INDEPENDENT CONTRASTS:         4

001 G/T 11    (11          ) 01010101                 GEND/TOL INTACT: 1. MALE      1. BIG CTY5
002 G/T 12    (12          ) -1000000                 GEND/TOL INTACT: 1. MALE      2. MID CTY5
003 G/T 13    (13          ) 00-10000                 GEND/TOL INTACT: 1. MALE      3. FR/BTWN5
004 G/T 14    (14          ) 0000-100                 GEND/TOL INTACT: 1. MALE      4. SML TWN5
005 G/T 15    (15          ) 000000-1                 GEND/TOL INTACT: 1. MALE      5. RURAL5
006 G/T 21    (21          ) -1-1-1-1                 GEND/TOL INTACT: 2. FEMALE    1. BIG CTY5
007 G/T 22    (22          ) 01000000                 GEND/TOL INTACT: 2. FEMALE    2. MID CTY5
008 G/T 23    (23          ) 00010000                 GEND/TOL INTACT: 2. FEMALE    3. FR/BTWN5
009 G/T 24    (24          ) 00000100                 GEND/TOL INTACT: 2. FEMALE    4. SML TWN5
010 G/T 25    (25          ) 00000001                 GEND/TOL INTACT: 2. FEMALE    5. RURAL5

CONDITIONING VARIABLE ID:    BACK0052
DESCRIPTION:                 INTERACTION:  GENDER BY PARENTS' EDUCATION
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      GEND/PAR
NAEP ID:                     N/A                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    10
TYPE OF CONTRAST:            INTERACTION              NUMBER OF INDEPENDENT CONTRASTS:         4

001 G/P 11    (11          ) 01010101                 GEND/PAR INTACT: 1. MALE      1. < HS
002 G/P 12    (12          ) -1000000                 GEND/PAR INTACT: 1. MALE      2. HS GRAD
003 G/P 13    (13          ) 00-10000                 GEND/PAR INTACT: 1. MALE      3. POST HS
004 G/P 14    (14          ) 0000-100                 GEND/PAR INTACT: 1. MALE      4. COL GRAD
005 G/P 15    (15          ) 000000-1                 GEND/PAR INTACT: 1. MALE      5. PARED-?
006 G/P 21    (21          ) -1-1-1-1                 GEND/PAR INTACT: 2. FEMALE    1. < HS
007 G/P 22    (22          ) 01000000                 GEND/PAR INTACT: 2. FEMALE    2. HS GRAD
008 G/P 23    (23          ) 00010000                 GEND/PAR INTACT: 2. FEMALE    3. POST HS
009 G/P 24    (24          ) 00000100                 GEND/PAR INTACT: 2. FEMALE    4. COL GRAD
010 G/P 25    (25          ) 00000001                 GEND/PAR INTACT: 2. FEMALE    5. PARED-?

CONDITIONING VARIABLE ID:    BACK0053
DESCRIPTION:                 INTERACTION:  GENDER BY SCHOOL TYPE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      GEND/SCH
NAEP ID:                     N/A                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
TYPE OF CONTRAST:            INTERACTION              NUMBER OF INDEPENDENT CONTRASTS:         2

001 G/S 11    (11          ) 0101                     GEND/SCH INTACT: 1. MALE      1. PUBLIC
002 G/S 12    (12          ) -100                     GEND/SCH INTACT: 1. MALE      2. PRIVATE
003 G/S 13    (13          ) 00-1                     GEND/SCH INTACT: 1. MALE      3. CATHOLIC
004 G/S 21    (21          ) -1-1                     GEND/SCH INTACT: 2. FEMALE    1. PUBLIC
005 G/S 22    (22          ) 0100                     GEND/SCH INTACT: 2. FEMALE    2. PRIVATE
006 G/S 23    (23          ) 0001                     GEND/SCH INTACT: 2. FEMALE    3. CATHOLIC

CONDITIONING VARIABLE ID:    BACK0054
DESCRIPTION:                 INTERACTION:  RACE/ETHNICITY BY TYPE OF LOCALE (5 CATEGORIES)
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:      RACE/TOL
NAEP ID:                     N/A                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    20
TYPE OF CONTRAST:            INTERACTION              NUMBER OF INDEPENDENT CONTRASTS:        12

001 R/T 11    (11          ) 010101010101010101010101 RACE/TOL INTACT: 1. WHI/AI/O 1. BIG CTY5
002 R/T 12    (12          ) -1000000-1000000-1000000 RACE/TOL INTACT: 1. WHI/AI/O 2. MID CTY5
003 R/T 13    (13          ) 00-1000000-1000000-10000 RACE/TOL INTACT: 1. WHI/AI/O 3. FR/BTWN5
004 R/T 14    (14          ) 0000-1000000-1000000-100 RACE/TOL INTACT: 1. WHI/AI/O 4. SML TWN5
005 R/T 15    (15          ) 000000-1000000-1000000-1 RACE/TOL INTACT: 1. WHI/AI/O 5. RURAL5
006 R/T 21    (21          ) -1-1-1-10000000000000000 RACE/TOL INTACT: 2. BLACK    1. BIG CTY5
007 R/T 22    (22          ) 010000000000000000000000 RACE/TOL INTACT: 2. BLACK    2. MID CTY5
008 R/T 23    (23          ) 000100000000000000000000 RACE/TOL INTACT: 2. BLACK    3. FR/BTWN5
009 R/T 24    (24          ) 000001000000000000000000 RACE/TOL INTACT: 2. BLACK    4. SML TWN5
010 R/T 25    (25          ) 000000010000000000000000 RACE/TOL INTACT: 2. BLACK    5. RURAL5
011 R/T 31    (31          ) 00000000-1-1-1-100000000 RACE/TOL INTACT: 3. HISPANIC 1. BIG CTY5
012 R/T 32    (32          ) 000000000100000000000000 RACE/TOL INTACT: 3. HISPANIC 2. MID CTY5
013 R/T 33    (33          ) 000000000001000000000000 RACE/TOL INTACT: 3. HISPANIC 3. FR/BTWN5
014 R/T 34    (34          ) 000000000000010000000000 RACE/TOL INTACT: 3. HISPANIC 4. SML TWN5
015 R/T 35    (35          ) 000000000000000100000000 RACE/TOL INTACT: 3. HISPANIC 5. RURAL5
016 R/T 41    (41          ) 0000000000000000-1-1-1-1 RACE/TOL INTACT: 4. ASIAN    1. BIG CTY5
017 R/T 42    (42          ) 000000000000000001000000 RACE/TOL INTACT: 4. ASIAN    2. MID CTY5
018 R/T 43    (43          ) 000000000000000000010000 RACE/TOL INTACT: 4. ASIAN    3. FR/BTWN5
019 R/T 44    (44          ) 000000000000000000000100 RACE/TOL INTACT: 4. ASIAN    4. SML TWN5
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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020 R/T 45   (45          ) 000000000000000000000001        RACE/TOL INTACT: 4. ASIAN    5. RURAL5

CONDITIONING VARIABLE ID:  BACK0055
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY PARENTS' EDUCATION
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/PAR
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    20
                                                            NUMBER OF INDEPENDENT CONTRASTS:        12

001 R/P 11   (11          ) 010101010101010101010101        RACE/PAR INTACT: 1. WHI/AI/O 1. < HS
002 R/P 12   (12          ) -1000000-1000000-1000000        RACE/PAR INTACT: 1. WHI/AI/O 2. HS GRAD
003 R/P 13   (13          ) 00-1000000-1000000-10000        RACE/PAR INTACT: 1. WHI/AI/O 3. POST HS
004 R/P 14   (14          ) 0000-1000000-1000000-100        RACE/PAR INTACT: 1. WHI/AI/O 4. COL GRAD
005 R/P 15   (15          ) 000000-1000000-1000000-1        RACE/PAR INTACT: 1. WHI/AI/O 5. PARED-?
006 R/P 21   (21          ) -1-1-1-10000000000000000        RACE/PAR INTACT: 2. BLACK    1. < HS
007 R/P 22   (22          ) 010000000000000000000000        RACE/PAR INTACT: 2. BLACK    2. HS GRAD
008 R/P 23   (23          ) 000100000000000000000000        RACE/PAR INTACT: 2. BLACK    3. POST HS
009 R/P 24   (24          ) 000001000000000000000000        RACE/PAR INTACT: 2. BLACK    4. COL GRAD
010 R/P 25   (25          ) 000000010000000000000000        RACE/PAR INTACT: 2. BLACK    5. PARED-?
011 R/P 31   (31          ) 00000000-1-1-1-100000000        RACE/PAR INTACT: 3. HISPANIC 1. < HS
012 R/P 32   (32          ) 000000000100000000000000        RACE/PAR INTACT: 3. HISPANIC 2. HS GRAD
013 R/P 33   (33          ) 000000000001000000000000        RACE/PAR INTACT: 3. HISPANIC 3. POST HS
014 R/P 34   (34          ) 000000000000010000000000        RACE/PAR INTACT: 3. HISPANIC 4. COL GRAD
015 R/P 35   (35          ) 000000000000000100000000        RACE/PAR INTACT: 3. HISPANIC 5. PARED-?
016 R/P 41   (41          ) 0000000000000000-1-1-1-1        RACE/PAR INTACT: 4. ASIAN    1. < HS
017 R/P 42   (42          ) 000000000000000001000000        RACE/PAR INTACT: 4. ASIAN    2. HS GRAD
018 R/P 43   (43          ) 000000000000000000010000        RACE/PAR INTACT: 4. ASIAN    3. POST HS
019 R/P 44   (44          ) 000000000000000000000100        RACE/PAR INTACT: 4. ASIAN    4. COL GRAD
020 R/P 45   (45          ) 000000000000000000000001        RACE/PAR INTACT: 4. ASIAN    5. PARED-?

CONDITIONING VARIABLE ID:  BACK0056
DESCRIPTION:               INTERACTION:  RACE/ETHNICITY BY SCHOOL TYPE
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    RACE/SCH
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    12
                                                            NUMBER OF INDEPENDENT CONTRASTS:         6

001 R/S 11   (11          ) 010101010101                    RACE/SCH INTACT: 1. WHI/AI/O 1. PUBLIC
002 R/S 12   (12          ) -100-100-100                    RACE/SCH INTACT: 1. WHI/AI/O 2. PRIVATE
003 R/S 13   (13          ) 00-100-100-1                    RACE/SCH INTACT: 1. WHI/AI/O 3. CATHOLIC
004 R/S 21   (21          ) -1-100000000                    RACE/SCH INTACT: 2. BLACK    1. PUBLIC
005 R/S 22   (22          ) 010000000000                    RACE/SCH INTACT: 2. BLACK    2. PRIVATE
006 R/S 23   (23          ) 000100000000                    RACE/SCH INTACT: 2. BLACK    3. CATHOLIC
007 R/S 31   (31          ) 0000-1-10000                    RACE/SCH INTACT: 3. HISPANIC 1. PUBLIC
008 R/S 32   (32          ) 000001000000                    RACE/SCH INTACT: 3. HISPANIC 2. PRIVATE
009 R/S 33   (33          ) 000000010000                    RACE/SCH INTACT: 3. HISPANIC 3. CATHOLIC
010 R/S 41   (41          ) 00000000-1-1                    RACE/SCH INTACT: 4. ASIAN    1. PUBLIC
011 R/S 42   (42          ) 000000000100                    RACE/SCH INTACT: 4. ASIAN    2. PRIVATE
012 R/S 43   (43          ) 000000000001                    RACE/SCH INTACT: 4. ASIAN    3. CATHOLIC

CONDITIONING VARIABLE ID:  BACK0057
DESCRIPTION:               INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY PARENT'S EDUCATION
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    TOL5/PAR
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
                                                            NUMBER OF INDEPENDENT CONTRASTS:        16

001 T/P 11   (11          ) 01010101010101010101010101010101 TOL5/PAR INTACT: 1. BIG CTY5 1. < HS
002 T/P 12   (12          ) -1000000-1000000-1000000-1000000 TOL5/PAR INTACT: 1. BIG CTY5 2. HS GRAD
003 T/P 13   (13          ) 00-1000000-1000000-1000000-10000 TOL5/PAR INTACT: 1. BIG CTY5 3. POST HS
004 T/P 14   (14          ) 0000-1000000-1000000-1000000-100 TOL5/PAR INTACT: 1. BIG CTY5 4. COL GRAD
005 T/P 15   (15          ) 000000-1000000-1000000-1000000-1 TOL5/PAR INTACT: 1. BIG CTY5 5. PARED-?
006 T/P 21   (21          ) -1-1-1-1000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 1. < HS
007 T/P 22   (22          ) 01000000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 2. HS GRAD
008 T/P 23   (23          ) 00010000000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 3. POST HS
009 T/P 24   (24          ) 00000100000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 4. COL GRAD
010 T/P 25   (25          ) 00000001000000000000000000000000 TOL5/PAR INTACT: 2. MID CTY5 5. PARED-?
011 T/P 31   (31          ) 00000000-1-1-1-10000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 1. < HS
012 T/P 32   (32          ) 00000000010000000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 2. HS GRAD
013 T/P 33   (33          ) 00000000000100000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 3. POST HS
014 T/P 34   (34          ) 00000000000001000000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 4. COL GRAD
015 T/P 35   (35          ) 00000000000000010000000000000000 TOL5/PAR INTACT: 3. FR/BTWN5 5. PARED-?
016 T/P 41   (41          ) 0000000000000000-1-1-1-100000000 TOL5/PAR INTACT: 4. SML TWN5 1. < HS
017 T/P 42   (42          ) 00000000000000000100000000000000 TOL5/PAR INTACT: 4. SML TWN5 2. HS GRAD
018 T/P 43   (43          ) 00000000000000000001000000000000 TOL5/PAR INTACT: 4. SML TWN5 3. POST HS
019 T/P 44   (44          ) 00000000000000000000010000000000 TOL5/PAR INTACT: 4. SML TWN5 4. COL GRAD
020 T/P 45   (45          ) 00000000000000000000000100000000 TOL5/PAR INTACT: 4. SML TWN5 5. PARED-?
021 T/P 51   (51          ) 000000000000000000000000-1-1-1-1 TOL5/PAR INTACT: 5. RURAL5   1. < HS
022 T/P 52   (52          ) 00000000000000000000000001000000 TOL5/PAR INTACT: 5. RURAL5   2. HS GRAD
023 T/P 53   (53          ) 00000000000000000000000000010000 TOL5/PAR INTACT: 5. RURAL5   3. POST HS
024 T/P 54   (54          ) 00000000000000000000000000000100 TOL5/PAR INTACT: 5. RURAL5   4. COL GRAD
025 T/P 55   (55          ) 00000000000000000000000000000001 TOL5/PAR INTACT: 5. RURAL5   5. PARED-?

CONDITIONING VARIABLE ID:  BACK0058
DESCRIPTION:               INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY SCHOOL TYPE
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    TOL5/SCH
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
NAEP ID:                      N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:   15
TYPE OF CONTRAST:             INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        8

001 T/S 11   (11            ) 0101010101010101             TOL5/SCH INTACT: 1. BIG CTY5 1. PUBLIC
002 T/S 12   (12            ) -100-100-100-100             TOL5/SCH INTACT: 1. BIG CTY5 2. PRIVATE
003 T/S 13   (13            ) 00-100-100-100-1             TOL5/SCH INTACT: 1. BIG CTY5 3. CATHOLIC
004 T/S 21   (21            ) -1-1000000000000             TOL5/SCH INTACT: 2. MID CTY5 1. PUBLIC
005 T/S 22   (22            ) 0100000000000000             TOL5/SCH INTACT: 2. MID CTY5 2. PRIVATE
006 T/S 23   (23            ) 0001000000000000             TOL5/SCH INTACT: 2. MID CTY5 3. CATHOLIC
007 T/S 31   (31            ) 0000-1-100000000             TOL5/SCH INTACT: 3. FR/BTWN5 1. PUBLIC
008 T/S 32   (32            ) 0000010000000000             TOL5/SCH INTACT: 3. FR/BTWN5 2. PRIVATE
009 T/S 33   (33            ) 0000000100000000             TOL5/SCH INTACT: 3. FR/BTWN5 3. CATHOLIC
010 T/S 41   (41            ) 00000000-1-10000             TOL5/SCH INTACT: 4. SML TWN5 1. PUBLIC
011 T/S 42   (42            ) 0000000001000000             TOL5/SCH INTACT: 4. SML TWN5 2. PRIVATE
012 T/S 43   (43            ) 0000000000010000             TOL5/SCH INTACT: 4. SML TWN5 3. CATHOLIC
013 T/S 51   (51            ) 000000000000-1-1             TOL5/SCH INTACT: 5. RURAL5   1. PUBLIC
014 T/S 52   (52            ) 0000000000000100             TOL5/SCH INTACT: 5. RURAL5   2. PRIVATE
015 T/S 53   (53            ) 0000000000000001             TOL5/SCH INTACT: 5. RURAL5   3. CATHOLIC

CONDITIONING VARIABLE ID:     BACK0059
DESCRIPTION:                  INTERACTION:  PARENTS' EDUCATION BY SCHOOL TYPE
GRADES/ASSESSMENTS:           N04, N08, S08, N12
CONDITIONING VAR LABEL:       PARE/SCH
NAEP ID:                      N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:   15
TYPE OF CONTRAST:             INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        8

001 P/S 11   (11            ) 0101010101010101             PARE/SCH INTACT: 1. < HS      1. PUBLIC
002 P/S 12   (12            ) -100-100-100-100             PARE/SCH INTACT: 1. < HS      2. PRIVATE
003 P/S 13   (13            ) 00-100-100-100-1             PARE/SCH INTACT: 1. < HS      3. CATHOLIC
004 P/S 21   (21            ) -1-1000000000000             PARE/SCH INTACT: 2. HS GRAD   1. PUBLIC
005 P/S 22   (22            ) 0100000000000000             PARE/SCH INTACT: 2. HS GRAD   2. PRIVATE
006 P/S 23   (23            ) 0001000000000000             PARE/SCH INTACT: 2. HS GRAD   3. CATHOLIC
007 P/S 31   (31            ) 0000-1-100000000             PARE/SCH INTACT: 3. POST HS   1. PUBLIC
008 P/S 32   (32            ) 0000010000000000             PARE/SCH INTACT: 3. POST HS   2. PRIVATE
009 P/S 33   (33            ) 0000000100000000             PARE/SCH INTACT: 3. POST HS   3. CATHOLIC
010 P/S 41   (41            ) 00000000-1-10000             PARE/SCH INTACT: 4. COL GRAD 1. PUBLIC
011 P/S 42   (42            ) 0000000001000000             PARE/SCH INTACT: 4. COL GRAD 2. PRIVATE
012 P/S 43   (43            ) 0000000000010000             PARE/SCH INTACT: 4. COL GRAD 3. CATHOLIC
013 P/S 51   (51            ) 000000000000-1-1             PARE/SCH INTACT: 5. PARED-?   1. PUBLIC
014 P/S 52   (52            ) 0000000000000100             PARE/SCH INTACT: 5. PARED-?   2. PRIVATE
015 P/S 53   (53            ) 0000000000000001             PARE/SCH INTACT: 5. PARED-?   3. CATHOLIC

CONDITIONING VARIABLE ID:     BACK0060
DESCRIPTION:                  INTERACTION:  GENDER BY SCIENCE COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:       GEND/
NAEP ID:                      N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:   14
TYPE OF CONTRAST:             INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:        6

001 G/  11   (11            ) 010101010101                 GEND/    INTACT: 1. MALE      1. NO SCIEN
002 G/  12   (12            ) -10000000000                 GEND/    INTACT: 1. MALE      2. LIFESCI
003 G/  13   (13            ) 00-100000000                 GEND/    INTACT: 1. MALE      3. PHYSSCI
004 G/  14   (14            ) 0000-1000000                 GEND/    INTACT: 1. MALE      4. EATHSCI
005 G/  15   (15            ) 000000-10000                 GEND/    INTACT: 1. MALE      5. GEN SCI
006 G/  16   (16            ) 00000000-100                 GEND/    INTACT: 1. MALE      6. INTESCI
007 G/  17   (17            ) 0000000000-1                 GEND/    INTACT: 1. MALE      7. MISSING
008 G/  21   (21            ) -1-1-1-1-1-1                 GEND/    INTACT: 2. FEMALE    1. NO SCIEN
009 G/  22   (22            ) 010000000000                 GEND/    INTACT: 2. FEMALE    2. LIFESCI
010 G/  23   (23            ) 000100000000                 GEND/    INTACT: 2. FEMALE    3. PHYSSCI
011 G/  24   (24            ) 000001000000                 GEND/    INTACT: 2. FEMALE    4. EATHSCI
012 G/  25   (25            ) 000000010000                 GEND/    INTACT: 2. FEMALE    5. GEN SCI
013 G/  26   (26            ) 000000000100                 GEND/    INTACT: 2. FEMALE    6. INTESCI
014 G/  27   (27            ) 000000000001                 GEND/    INTACT: 2. FEMALE    7. MISSING

CONDITIONING VARIABLE ID:     BACK0062
DESCRIPTION:                  INTERACTION:  RACE/ETHNICITY BY SCIENCE COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:       RACE/
NAEP ID:                      N/A                          TOTAL NUMBER OF SPECIFIED CONTRASTS:   28
TYPE OF CONTRAST:             INTERACTION                  NUMBER OF INDEPENDENT CONTRASTS:       18

001 R/  11   (11            ) 333333333333333333           RACE/    INTACT: 1. WHI/AI/O 1. NO SCIEN
002 R/  12   (12            ) 122222122222122222           RACE/    INTACT: 1. WHI/AI/O 2. LIFESCI
003 R/  13   (13            ) 212222212222212222           RACE/    INTACT: 1. WHI/AI/O 3. PHYSSCI
004 R/  14   (14            ) 221222221222221222           RACE/    INTACT: 1. WHI/AI/O 4. EATHSCI
005 R/  15   (15            ) 222122222122222122           RACE/    INTACT: 1. WHI/AI/O 5. GEN SCI
006 R/  16   (16            ) 222212222212222212           RACE/    INTACT: 1. WHI/AI/O 6. INTESCI
007 R/  17   (17            ) 222221222221222221           RACE/    INTACT: 1. WHI/AI/O 7. MISSING
008 R/  21   (21            ) 111111222222222222           RACE/    INTACT: 2. BLACK     1. NO SCIEN
009 R/  22   (22            ) 322222222222222222           RACE/    INTACT: 2. BLACK     2. LIFESCI
010 R/  23   (23            ) 232222222222222222           RACE/    INTACT: 2. BLACK     3. PHYSSCI
011 R/  24   (24            ) 223222222222222222           RACE/    INTACT: 2. BLACK     4. EATHSCI
012 R/  25   (25            ) 222322222222222222           RACE/    INTACT: 2. BLACK     5. GEN SCI
013 R/  26   (26            ) 222232222222222222           RACE/    INTACT: 2. BLACK     6. INTESCI
014 R/  27   (27            ) 222223222222222222           RACE/    INTACT: 2. BLACK     7. MISSING
015 R/  31   (31            ) 222222111111222222           RACE/    INTACT: 3. HISPANIC 1. NO SCIEN
016 R/  32   (32            ) 222222322222222222           RACE/    INTACT: 3. HISPANIC 2. LIFESCI
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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017 R/  33   (33          ) 222222232222222222          RACE/    INTACT: 3. HISPANIC 3. PHYSSCI
018 R/  34   (34          ) 222222223222222222          RACE/    INTACT: 3. HISPANIC 4. EATHSCI
019 R/  35   (35          ) 222222222322222222          RACE/    INTACT: 3. HISPANIC 5. GEN SCI
020 R/  36   (36          ) 222222222232222222          RACE/    INTACT: 3. HISPANIC 6. INTESCI
021 R/  37   (37          ) 222222222223222222          RACE/    INTACT: 3. HISPANIC 7. MISSING
022 R/  41   (41          ) 222222222222111111          RACE/    INTACT: 4. ASIAN    1. NO SCIEN
023 R/  42   (42          ) 222222222222322222          RACE/    INTACT: 4. ASIAN    2. LIFESCI
024 R/  43   (43          ) 222222222222232222          RACE/    INTACT: 4. ASIAN    3. PHYSSCI
025 R/  44   (44          ) 222222222222223222          RACE/    INTACT: 4. ASIAN    4. EATHSCI
026 R/  45   (45          ) 222222222222222322          RACE/    INTACT: 4. ASIAN    5. GEN SCI
027 R/  46   (46          ) 222222222222222232          RACE/    INTACT: 4. ASIAN    6. INTESCI
028 R/  47   (47          ) 222222222222222223          RACE/    INTACT: 4. ASIAN    7. MISSING

CONDITIONING VARIABLE ID:  BACK0064
DESCRIPTION:               INTERACTION:  PARENTS' EDUCATION BY SCIENCE COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:    PARE/
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    35
                                                        NUMBER OF INDEPENDENT CONTRASTS:        24

001 P/  11   (11          ) 333333333333333333333333    PARE/    INTACT: 1. < HS     1. NO SCIEN
002 P/  12   (12          ) 122222122222122222122222    PARE/    INTACT: 1. < HS     2. LIFESCI
003 P/  13   (13          ) 212222212222212222212222    PARE/    INTACT: 1. < HS     3. PHYSSCI
004 P/  14   (14          ) 221222221222221222221222    PARE/    INTACT: 1. < HS     4. EATHSCI
005 P/  15   (15          ) 222122222122222122222122    PARE/    INTACT: 1. < HS     5. GEN SCI
006 P/  16   (16          ) 222212222212222212222212    PARE/    INTACT: 1. < HS     6. INTESCI
007 P/  17   (17          ) 222221222221222221222221    PARE/    INTACT: 1. < HS     7. MISSING
008 P/  21   (21          ) 111111222222222222222222    PARE/    INTACT: 2. HS GRAD  1. NO SCIEN
009 P/  22   (22          ) 322222222222222222222222    PARE/    INTACT: 2. HS GRAD  2. LIFESCI
010 P/  23   (23          ) 232222222222222222222222    PARE/    INTACT: 2. HS GRAD  3. PHYSSCI
011 P/  24   (24          ) 223222222222222222222222    PARE/    INTACT: 2. HS GRAD  4. EATHSCI
012 P/  25   (25          ) 222322222222222222222222    PARE/    INTACT: 2. HS GRAD  5. GEN SCI
013 P/  26   (26          ) 222232222222222222222222    PARE/    INTACT: 2. HS GRAD  6. INTESCI
014 P/  27   (27          ) 222223222222222222222222    PARE/    INTACT: 2. HS GRAD  7. MISSING
015 P/  31   (31          ) 222222111111222222222222    PARE/    INTACT: 3. POST HS  1. NO SCIEN
016 P/  32   (32          ) 222222322222222222222222    PARE/    INTACT: 3. POST HS  2. LIFESCI
017 P/  33   (33          ) 222222232222222222222222    PARE/    INTACT: 3. POST HS  3. PHYSSCI
018 P/  34   (34          ) 222222223222222222222222    PARE/    INTACT: 3. POST HS  4. EATHSCI
019 P/  35   (35          ) 222222222322222222222222    PARE/    INTACT: 3. POST HS  5. GEN SCI
020 P/  36   (36          ) 222222222232222222222222    PARE/    INTACT: 3. POST HS  6. INTESCI
021 P/  37   (37          ) 222222222223222222222222    PARE/    INTACT: 3. POST HS  7. MISSING
022 P/  41   (41          ) 222222222222111111222222    PARE/    INTACT: 4. COL GRAD 1. NO SCIEN
023 P/  42   (42          ) 222222222222322222222222    PARE/    INTACT: 4. COL GRAD 2. LIFESCI
024 P/  43   (43          ) 222222222222232222222222    PARE/    INTACT: 4. COL GRAD 3. PHYSSCI
025 P/  44   (44          ) 222222222222223222222222    PARE/    INTACT: 4. COL GRAD 4. EATHSCI
026 P/  45   (45          ) 222222222222222322222222    PARE/    INTACT: 4. COL GRAD 5. GEN SCI
027 P/  46   (46          ) 222222222222222232222222    PARE/    INTACT: 4. COL GRAD 6. INTESCI
028 P/  47   (47          ) 222222222222222223222222    PARE/    INTACT: 4. COL GRAD 7. MISSING
029 P/  51   (51          ) 222222222222222222111111    PARE/    INTACT: 5. PARED-?  1. NO SCIEN
030 P/  52   (52          ) 222222222222222222322222    PARE/    INTACT: 5. PARED-?  2. LIFESCI
031 P/  53   (53          ) 222222222222222222232222    PARE/    INTACT: 5. PARED-?  3. PHYSSCI
032 P/  54   (54          ) 222222222222222222223222    PARE/    INTACT: 5. PARED-?  4. EATHSCI
033 P/  55   (55          ) 222222222222222222222322    PARE/    INTACT: 5. PARED-?  5. GEN SCI
034 P/  56   (56          ) 222222222222222222222232    PARE/    INTACT: 5. PARED-?  6. INTESCI
035 P/  57   (57          ) 222222222222222222222223    PARE/    INTACT: 5. PARED-?  7. MISSING

CONDITIONING VARIABLE ID:  BACK0066
DESCRIPTION:               INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY SCIENCE COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:    TOL5/
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    35
                                                        NUMBER OF INDEPENDENT CONTRASTS:        24

001 T/  11   (11          ) 333333333333333333333333    TOL5/    INTACT: 1. BIG CTY5 1. NO SCIEN
002 T/  12   (12          ) 122222122222122222122222    TOL5/    INTACT: 1. BIG CTY5 2. LIFESCI
003 T/  13   (13          ) 212222212222212222212222    TOL5/    INTACT: 1. BIG CTY5 3. PHYSSCI
004 T/  14   (14          ) 221222221222221222221222    TOL5/    INTACT: 1. BIG CTY5 4. EATHSCI
005 T/  15   (15          ) 222122222122222122222122    TOL5/    INTACT: 1. BIG CTY5 5. GEN SCI
006 T/  16   (16          ) 222212222212222212222212    TOL5/    INTACT: 1. BIG CTY5 6. INTESCI
007 T/  17   (17          ) 222221222221222221222221    TOL5/    INTACT: 1. BIG CTY5 7. MISSING
008 T/  21   (21          ) 111111222222222222222222    TOL5/    INTACT: 2. MID CTY5 1. NO SCIEN
009 T/  22   (22          ) 322222222222222222222222    TOL5/    INTACT: 2. MID CTY5 2. LIFESCI
010 T/  23   (23          ) 232222222222222222222222    TOL5/    INTACT: 2. MID CTY5 3. PHYSSCI
011 T/  24   (24          ) 223222222222222222222222    TOL5/    INTACT: 2. MID CTY5 4. EATHSCI
012 T/  25   (25          ) 222322222222222222222222    TOL5/    INTACT: 2. MID CTY5 5. GEN SCI
013 T/  26   (26          ) 222232222222222222222222    TOL5/    INTACT: 2. MID CTY5 6. INTESCI
014 T/  27   (27          ) 222223222222222222222222    TOL5/    INTACT: 2. MID CTY5 7. MISSING
015 T/  31   (31          ) 222222111111222222222222    TOL5/    INTACT: 3. FR/BTWN5 1. NO SCIEN
016 T/  32   (32          ) 222222322222222222222222    TOL5/    INTACT: 3. FR/BTWN5 2. LIFESCI
017 T/  33   (33          ) 222222232222222222222222    TOL5/    INTACT: 3. FR/BTWN5 3. PHYSSCI
018 T/  34   (34          ) 222222223222222222222222    TOL5/    INTACT: 3. FR/BTWN5 4. EATHSCI
019 T/  35   (35          ) 222222222322222222222222    TOL5/    INTACT: 3. FR/BTWN5 5. GEN SCI
020 T/  36   (36          ) 222222222232222222222222    TOL5/    INTACT: 3. FR/BTWN5 6. INTESCI
021 T/  37   (37          ) 222222222223222222222222    TOL5/    INTACT: 3. FR/BTWN5 7. MISSING
022 T/  41   (41          ) 222222222222111111222222    TOL5/    INTACT: 4. SML TWN5 1. NO SCIEN
023 T/  42   (42          ) 222222222222322222222222    TOL5/    INTACT: 4. SML TWN5 2. LIFESCI
024 T/  43   (43          ) 222222222222232222222222    TOL5/    INTACT: 4. SML TWN5 3. PHYSSCI
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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025 T/  44   (44          ) 222222222222223222222222      TOL5/    INTACT: 4. SML TWN5 4. EATHSCI
026 T/  45   (45          ) 222222222222222322222222      TOL5/    INTACT: 4. SML TWN5 5. GEN SCI
027 T/  46   (46          ) 222222222222222232222222      TOL5/    INTACT: 4. SML TWN5 6. INTESCI
028 T/  47   (47          ) 222222222222222223222222      TOL5/    INTACT: 4. SML TWN5 7. MISSING
029 T/  51   (51          ) 222222222222222222111111      TOL5/    INTACT: 5. RURAL5   1. NO SCIEN
030 T/  52   (52          ) 222222222222222222322222      TOL5/    INTACT: 5. RURAL5   2. LIFESCI
031 T/  53   (53          ) 222222222222222222232222      TOL5/    INTACT: 5. RURAL5   3. PHYSSCI
032 T/  54   (54          ) 222222222222222222223222      TOL5/    INTACT: 5. RURAL5   4. EATHSCI
033 T/  55   (55          ) 222222222222222222222322      TOL5/    INTACT: 5. RURAL5   5. GEN SCI
034 T/  56   (56          ) 222222222222222222222232      TOL5/    INTACT: 5. RURAL5   6. INTESCI
035 T/  57   (57          ) 222222222222222222222223      TOL5/    INTACT: 5. RURAL5   7. MISSING

CONDITIONING VARIABLE ID:   BACK0068
DESCRIPTION:                INTERACTION:  SCHOOL TYPE BY SCIENCE COURSES TAKING THIS YEAR
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:     SCHT/
NAEP ID:                    N/A                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    21
TYPE OF CONTRAST:           INTERACTION                   NUMBER OF INDEPENDENT CONTRASTS:        12

001 S/  11   (11          ) -1-1-1-1-1-1-1-1-1-1-1-1      SCHT/    INTACT: 1. PUBLIC   1. NO SCIEN
002 S/  12   (12          ) -10000000000-10000000000      SCHT/    INTACT: 1. PUBLIC   2. LIFESCI
003 S/  13   (13          ) 00-10000000000-100000000      SCHT/    INTACT: 1. PUBLIC   3. PHYSSCI
004 S/  14   (14          ) 0000-10000000000-1000000      SCHT/    INTACT: 1. PUBLIC   4. EATHSCI
005 S/  15   (15          ) 000000-10000000000-10000      SCHT/    INTACT: 1. PUBLIC   5. GEN SCI
006 S/  16   (16          ) 00000000-10000000000-100      SCHT/    INTACT: 1. PUBLIC   6. INTESCI
007 S/  17   (17          ) 0000000000-10000000000-1      SCHT/    INTACT: 1. PUBLIC   7. MISSING
008 S/  21   (21          ) -1-1-1-1-1-1000000000000      SCHT/    INTACT: 2. PRIVATE  1. NO SCIEN
009 S/  22   (22          ) 010000000000000000000000      SCHT/    INTACT: 2. PRIVATE  2. LIFESCI
010 S/  23   (23          ) 000100000000000000000000      SCHT/    INTACT: 2. PRIVATE  3. PHYSSCI
011 S/  24   (24          ) 000001000000000000000000      SCHT/    INTACT: 2. PRIVATE  4. EATHSCI
012 S/  25   (25          ) 000000010000000000000000      SCHT/    INTACT: 2. PRIVATE  5. GEN SCI
013 S/  26   (26          ) 000000000100000000000000      SCHT/    INTACT: 2. PRIVATE  6. INTESCI
014 S/  27   (27          ) 000000000001000000000000      SCHT/    INTACT: 2. PRIVATE  7. MISSING
015 S/  31   (31          ) 000000000000010101010101      SCHT/    INTACT: 3. CATHOLIC 1. NO SCIEN
016 S/  32   (32          ) 000000000000010000000000      SCHT/    INTACT: 3. CATHOLIC 2. LIFESCI
017 S/  33   (33          ) 000000000000000100000000      SCHT/    INTACT: 3. CATHOLIC 3. PHYSSCI
018 S/  34   (34          ) 000000000000000001000000      SCHT/    INTACT: 3. CATHOLIC 4. EATHSCI
019 S/  35   (35          ) 000000000000000000010000      SCHT/    INTACT: 3. CATHOLIC 5. GEN SCI
020 S/  36   (36          ) 000000000000000000000100      SCHT/    INTACT: 3. CATHOLIC 6. INTESCI
021 S/  37   (37          ) 000000000000000000000001      SCHT/    INTACT: 3. CATHOLIC 7. MISSING

CONDITIONING VARIABLE ID:   BACK0061
DESCRIPTION:                INTERACTION:  GENDER BY NUMBER OF SEMESTERS SCIENCE
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:     GEND/SEM
NAEP ID:                    N/A                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    10
TYPE OF CONTRAST:           INTERACTION                   NUMBER OF INDEPENDENT CONTRASTS:         4

001 G/S 11   (11          ) 01010101                      GEND/SEM INTACT: 1. MALE       1. SEMSCI-?
002 G/S 12   (12          ) -1000000                      GEND/SEM INTACT: 1. MALE       2. SEMSCI-^
003 G/S 13   (13          ) 00-10000                      GEND/SEM INTACT: 1. MALE       3. SEMSCI-^
004 G/S 14   (14          ) 0000-100                      GEND/SEM INTACT: 1. MALE       4. SEMSCI-^
005 G/S 15   (15          ) 0000-100                      GEND/SEM INTACT: 1. MALE       5. SEMSCI-^
006 G/S 21   (21          ) -1-1-1-1                      GEND/SEM INTACT: 2. FEMALE     1. SEMSCI-?
007 G/S 22   (22          ) 01000000                      GEND/SEM INTACT: 2. FEMALE     2. SEMSCI-^
008 G/S 23   (23          ) 00010000                      GEND/SEM INTACT: 2. FEMALE     3. SEMSCI-^
009 G/S 24   (24          ) 00000100                      GEND/SEM INTACT: 2. FEMALE     4. SEMSCI-^
010 G/S 25   (25          ) 00000100                      GEND/SEM INTACT: 2. FEMALE     5. SEMSCI-^

CONDITIONING VARIABLE ID:   BACK0063
DESCRIPTION:                INTERACTION:  RACE/ETHNICITY BY NUMBER OF SEMESTERS SCIENCE
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:     RACE/SEM
NAEP ID:                    N/A                           TOTAL NUMBER OF SPECIFIED CONTRASTS:    20
TYPE OF CONTRAST:           INTERACTION                   NUMBER OF INDEPENDENT CONTRASTS:        12

001 R/S 11   (11          ) 010101010101010101010101      RACE/SEM INTACT: 1. WHI/AI/O 1. SEMSCI-?
002 R/S 12   (12          ) -1000000-1000000-1000000      RACE/SEM INTACT: 1. WHI/AI/O 2. SEMSCI-^
003 R/S 13   (13          ) 00-1000000-1000000-10000      RACE/SEM INTACT: 1. WHI/AI/O 3. SEMSCI-^
004 R/S 14   (14          ) 0000-1000000-1000000-100      RACE/SEM INTACT: 1. WHI/AI/O 4. SEMSCI-^
005 R/S 15   (15          ) 000000-1000000-1000000-1      RACE/SEM INTACT: 1. WHI/AI/O 5. SEMSCI-^
006 R/S 21   (21          ) -1-1-1000000000000000000      RACE/SEM INTACT: 2. BLACK    1. SEMSCI-?
007 R/S 22   (22          ) 010000000000000000000000      RACE/SEM INTACT: 2. BLACK    2. SEMSCI-^
008 R/S 23   (23          ) 000100000000000000000000      RACE/SEM INTACT: 2. BLACK    3. SEMSCI-^
009 R/S 24   (24          ) 000001000000000000000000      RACE/SEM INTACT: 2. BLACK    4. SEMSCI-^
010 R/S 25   (25          ) 000000010000000000000000      RACE/SEM INTACT: 2. BLACK    5. SEMSCI-^
011 R/S 31   (31          ) 000000-1-1-1000000000000      RACE/SEM INTACT: 3. HISPANIC 1. SEMSCI-?
012 R/S 32   (32          ) 000000000100000000000000      RACE/SEM INTACT: 3. HISPANIC 2. SEMSCI-^
013 R/S 33   (33          ) 000000000001000000000000      RACE/SEM INTACT: 3. HISPANIC 3. SEMSCI-^
014 R/S 34   (34          ) 000000000000010000000000      RACE/SEM INTACT: 3. HISPANIC 4. SEMSCI-^
015 R/S 35   (35          ) 000000000000000100000000      RACE/SEM INTACT: 3. HISPANIC 5. SEMSCI-^
016 R/S 41   (41          ) 000000000000-1-1-1000000      RACE/SEM INTACT: 4. ASIAN    1. SEMSCI-?
017 R/S 42   (42          ) 000000000000000001000000      RACE/SEM INTACT: 4. ASIAN    2. SEMSCI-^
018 R/S 43   (43          ) 000000000000000000010000      RACE/SEM INTACT: 4. ASIAN    3. SEMSCI-^
019 R/S 44   (44          ) 000000000000000000000100      RACE/SEM INTACT: 4. ASIAN    4. SEMSCI-^
020 R/S 45   (45          ) 000000000000000000000001      RACE/SEM INTACT: 4. ASIAN    5. SEMSCI-^
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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CONDITIONING VARIABLE ID:  BACK0065
DESCRIPTION:               INTERACTION:  PARENTS' EDUCATION BY NUMBER OF SEMESTERS SCIENCE
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    PARE/SEM
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
                                                        NUMBER OF INDEPENDENT CONTRASTS:        16

001 P/S 11    (11       ) 01010101010101010101010101010101 PARE/SEM INTACT: 1. < HS     1. SEMSCI-?
002 P/S 12    (12       ) -1000000-1000000-1000000-1000000 PARE/SEM INTACT: 1. < HS     2. SEMSCI-^
003 P/S 13    (13       ) 00-1000000-1000000-1000000-10000 PARE/SEM INTACT: 1. < HS     3. SEMSCI-^
004 P/S 14    (14       ) 0000-1000000-1000000-1000000-100 PARE/SEM INTACT: 1. < HS     4. SEMSCI-^
005 P/S 15    (15       ) 000000-1000000-1000000-1000000-1 PARE/SEM INTACT: 1. < HS     5. SEMSCI-^
006 P/S 21    (21       ) -1-1-100000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  1. SEMSCI-?
007 P/S 22    (22       ) 01000000000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  2. SEMSCI-^
008 P/S 23    (23       ) 00010000000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  3. SEMSCI-^
009 P/S 24    (24       ) 00000100000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  4. SEMSCI-^
010 P/S 25    (25       ) 00000001000000000000000000000000 PARE/SEM INTACT: 2. HS GRAD  5. SEMSCI-^
011 P/S 31    (31       ) 000000-1-1-100000000000000000000 PARE/SEM INTACT: 3. POST HS  1. SEMSCI-?
012 P/S 32    (32       ) 00000000010000000000000000000000 PARE/SEM INTACT: 3. POST HS  2. SEMSCI-^
013 P/S 33    (33       ) 00000000000100000000000000000000 PARE/SEM INTACT: 3. POST HS  3. SEMSCI-^
014 P/S 34    (34       ) 00000000000001000000000000000000 PARE/SEM INTACT: 3. POST HS  4. SEMSCI-^
015 P/S 35    (35       ) 00000000000000010000000000000000 PARE/SEM INTACT: 3. POST HS  5. SEMSCI-^
016 P/S 41    (41       ) 000000000000-1-1-100000000000000 PARE/SEM INTACT: 4. COL GRAD 1. SEMSCI-?
017 P/S 42    (42       ) 00000000000000000100000000000000 PARE/SEM INTACT: 4. COL GRAD 2. SEMSCI-^
018 P/S 43    (43       ) 00000000000000000001000000000000 PARE/SEM INTACT: 4. COL GRAD 3. SEMSCI-^
019 P/S 44    (44       ) 00000000000000000000010000000000 PARE/SEM INTACT: 4. COL GRAD 4. SEMSCI-^
020 P/S 45    (45       ) 00000000000000000000000100000000 PARE/SEM INTACT: 4. COL GRAD 5. SEMSCI-^
021 P/S 51    (51       ) 000000000000000000-1-1-100000000 PARE/SEM INTACT: 5. PARED-?  1. SEMSCI-?
022 P/S 52    (52       ) 00000000000000000000000001000000 PARE/SEM INTACT: 5. PARED-?  2. SEMSCI-^
023 P/S 53    (53       ) 00000000000000000000000000010000 PARE/SEM INTACT: 5. PARED-?  3. SEMSCI-^
024 P/S 54    (54       ) 00000000000000000000000000000100 PARE/SEM INTACT: 5. PARED-?  4. SEMSCI-^
025 P/S 55    (55       ) 00000000000000000000000000000001 PARE/SEM INTACT: 5. PARED-?  5. SEMSCI-^

CONDITIONING VARIABLE ID:  BACK0067
DESCRIPTION:               INTERACTION:  TYPE OF LOCALE (5 CATEGORIES) BY NUMBER OF SEMESTERS SCIENCE
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    TOL5/SEM
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    25
                                                        NUMBER OF INDEPENDENT CONTRASTS:        16

001 T/S 11    (11       ) 01010101010101010101010101010101 TOL5/SEM INTACT: 1. BIG CTY5 1. SEMSCI-?
002 T/S 12    (12       ) -1000000-1000000-1000000-1000000 TOL5/SEM INTACT: 1. BIG CTY5 2. SEMSCI-^
003 T/S 13    (13       ) 00-1000000-1000000-1000000-10000 TOL5/SEM INTACT: 1. BIG CTY5 3. SEMSCI-^
004 T/S 14    (14       ) 0000-1000000-1000000-1000000-100 TOL5/SEM INTACT: 1. BIG CTY5 4. SEMSCI-^
005 T/S 15    (15       ) 000000-1000000-1000000-1000000-1 TOL5/SEM INTACT: 1. BIG CTY5 5. SEMSCI-^
006 T/S 21    (21       ) -1-1-100000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 1. SEMSCI-?
007 T/S 22    (22       ) 01000000000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 2. SEMSCI-^
008 T/S 23    (23       ) 00010000000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 3. SEMSCI-^
009 T/S 24    (24       ) 00000100000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 4. SEMSCI-^
010 T/S 25    (25       ) 00000001000000000000000000000000 TOL5/SEM INTACT: 2. MID CTY5 5. SEMSCI-^
011 T/S 31    (31       ) 000000-1-1-100000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 1. SEMSCI-?
012 T/S 32    (32       ) 00000000010000000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 2. SEMSCI-^
013 T/S 33    (33       ) 00000000000100000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 3. SEMSCI-^
014 T/S 34    (34       ) 00000000000001000000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 4. SEMSCI-^
015 T/S 35    (35       ) 00000000000000010000000000000000 TOL5/SEM INTACT: 3. FR/BTWN5 5. SEMSCI-^
016 T/S 41    (41       ) 000000000000-1-1-100000000000000 TOL5/SEM INTACT: 4. SML TWN5 1. SEMSCI-?
017 T/S 42    (42       ) 00000000000000000100000000000000 TOL5/SEM INTACT: 4. SML TWN5 2. SEMSCI-^
018 T/S 43    (43       ) 00000000000000000001000000000000 TOL5/SEM INTACT: 4. SML TWN5 3. SEMSCI-^
019 T/S 44    (44       ) 00000000000000000000010000000000 TOL5/SEM INTACT: 4. SML TWN5 4. SEMSCI-^
020 T/S 45    (45       ) 00000000000000000000000100000000 TOL5/SEM INTACT: 4. SML TWN5 5. SEMSCI-^
021 T/S 51    (51       ) 000000000000000000-1-1-100000000 TOL5/SEM INTACT: 5. RURAL5   1. SEMSCI-?
022 T/S 52    (52       ) 00000000000000000000000001000000 TOL5/SEM INTACT: 5. RURAL5   2. SEMSCI-^
023 T/S 53    (53       ) 00000000000000000000000000010000 TOL5/SEM INTACT: 5. RURAL5   3. SEMSCI-^
024 T/S 54    (54       ) 00000000000000000000000000000100 TOL5/SEM INTACT: 5. RURAL5   4. SEMSCI-^
025 T/S 55    (55       ) 00000000000000000000000000000001 TOL5/SEM INTACT: 5. RURAL5   5. SEMSCI-^

CONDITIONING VARIABLE ID:  BACK0069
DESCRIPTION:               INTERACTION:  SCHOOL TYPE BY NUMBER OF SEMESTERS SCIENCE
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:    SCHT/SEM
NAEP ID:                   N/A
TYPE OF CONTRAST:          INTERACTION                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    15
                                                        NUMBER OF INDEPENDENT CONTRASTS:         8

001 S/S 11    (11       ) 0101010101010101                 SCHT/SEM INTACT: 1. PUBLIC   1. SEMSCI-?
002 S/S 12    (12       ) -1000000-1000000                 SCHT/SEM INTACT: 1. PUBLIC   2. SEMSCI-^
003 S/S 13    (13       ) 00-1000000-10000                 SCHT/SEM INTACT: 1. PUBLIC   3. SEMSCI-^
004 S/S 14    (14       ) 0000-1000000-100                 SCHT/SEM INTACT: 1. PUBLIC   4. SEMSCI-^
005 S/S 15    (15       ) 000000-1000000-1                 SCHT/SEM INTACT: 1. PUBLIC   5. SEMSCI-^
006 S/S 21    (21       ) -1-1-10000000000                 SCHT/SEM INTACT: 2. PRIVATE  1. SEMSCI-?
007 S/S 22    (22       ) 0100000000000000                 SCHT/SEM INTACT: 2. PRIVATE  2. SEMSCI-^
008 S/S 23    (23       ) 0001000000000000                 SCHT/SEM INTACT: 2. PRIVATE  3. SEMSCI-^
009 S/S 24    (24       ) 0000010000000000                 SCHT/SEM INTACT: 2. PRIVATE  4. SEMSCI-^
010 S/S 25    (25       ) 0000000100000000                 SCHT/SEM INTACT: 2. PRIVATE  5. SEMSCI-^
011 S/S 31    (31       ) 000000-1-1-10000                 SCHT/SEM INTACT: 3. CATHOLIC 1. SEMSCI-?
012 S/S 32    (32       ) 0000000001000000                 SCHT/SEM INTACT: 3. CATHOLIC 2. SEMSCI-^
013 S/S 33    (33       ) 0000000000010000                 SCHT/SEM INTACT: 3. CATHOLIC 3. SEMSCI-^
014 S/S 34    (34       ) 0000000000000100                 SCHT/SEM INTACT: 3. CATHOLIC 4. SEMSCI-^
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
015 S/S 35   (35         ) 0000000000000001          SCHT/SEM INTACT: 3. CATHOLIC 5. SEMSCI-^

CONDITIONING VARIABLE ID:  BACK0073
DESCRIPTION:               SAMPLE TYPE
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   SUBSAMP                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       2

001 SAMP S1  (01         ) 00                        SAMPLE S1      .
002 SAMP S2  (02         ) 10                        SAMPLE S2  AND S3
003 SAMP S3  (03         ) 01                        SAMPLE S3  AND S3

CONDITIONING VARIABLE ID:  BACK0074
DESCRIPTION:               INTERACTION:  SAMPLE BY RACE/ETHNICITY
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:       /RAC
NAEP ID:                   N/A                       TOTAL NUMBER OF SPECIFIED CONTRASTS:  12
TYPE OF CONTRAST:          INTERACTION               NUMBER OF INDEPENDENT CONTRASTS:       6

001  /R 11   (11         ) 010101010101                 /RAC INTACT: 1. SAMP S1  1. WHI/AI/O
002  /R 12   (12         ) -10000-10000                 /RAC INTACT: 1. SAMP S1  2. BLACK
003  /R 13   (13         ) 00-10000-100                 /RAC INTACT: 1. SAMP S1  3. HISPANIC
004  /R 14   (14         ) 0000-10000-1                 /RAC INTACT: 1. SAMP S1  4. ASIAN
005  /R 21   (21         ) -1-1-1000000                 /RAC INTACT: 2. SAMP S2  1. WHI/AI/O
006  /R 22   (22         ) 010000000000                 /RAC INTACT: 2. SAMP S2  2. BLACK
007  /R 23   (23         ) 000100000000                 /RAC INTACT: 2. SAMP S2  3. HISPANIC
008  /R 24   (24         ) 000001000000                 /RAC INTACT: 2. SAMP S2  4. ASIAN
009  /R 31   (31         ) 000000-1-1-1                 /RAC INTACT: 3. SAMP S3  1. WHI/AI/O
010  /R 32   (32         ) 000000010000                 /RAC INTACT: 3. SAMP S3  2. BLACK
011  /R 33   (33         ) 000000000100                 /RAC INTACT: 3. SAMP S3  3. HISPANIC
012  /R 34   (34         ) 000000000001                 /RAC INTACT: 3. SAMP S3  4. ASIAN

CONDITIONING VARIABLE ID:  BACK0075
DESCRIPTION:               DO YOU HAVE YOUR OWN STUDY DESK OR TABLE AT HOME?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   B008901                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       3

001 B008901Y (01         ) 000                       YES
002 B008901N (02         ) 100                       NO
003 B008901C (03         ) 010                       IDK
004 B008901M (M          ) 001                       MISSING    .

CONDITIONING VARIABLE ID:  BACK0076
DESCRIPTION:               HOW SAFE DO YOU FEEL AT SCHOOL?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   B009401                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       4

001 VRY SAFE (01         ) 0000                      VERY SAFE
002 SAFE     (02         ) 1000                      SOMEWHAT SAFE
003 UNSAFE   (03         ) 0100                      SOMEWHAT UNSAFE
004 VRUNSAFE (04         ) 0010                      VERY UNSAFE
005 MISSING  (M          ) 0001                      MISSING

CONDITIONING VARIABLE ID:  BACK0077
DESCRIPTION:               DOES MOTHER OR STEPMOTHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    MOM@HOME
NAEP ID:                   B005601                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       2

001 MOMHOM-Y (1          ) 00                        MOTHER AT HOME:  YES
002 MOMHOM-N (2          ) 10                        MOTHER AT HOME:  NO
003 MOMHOM-? (M          ) 01                        MOTHER AT HOME:  MISSING

CONDITIONING VARIABLE ID:  BACK0078
DESCRIPTION:               DOES FATHER OR STEPFATHER LIVE AT HOME WITH YOU?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:    DAD@HOME
NAEP ID:                   B005701                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       2

001 DADHOM-Y (1          ) 00                        FATHER AT HOME:  YES
002 DADHOM-N (2          ) 10                        FATHER AT HOME:  NO
003 DADHOM-? (M          ) 01                        FATHER AT HOME:  MISSING

CONDITIONING VARIABLE ID:  SUBJ0002
DESCRIPTION:               AGREE/DISAGREE: I LIKE SCIENCE
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811001                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       3
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 K811001A (01          ) 000                AGREE
002 K811001B (02          ) 100                NOT SURE
003 K811001C (03          ) 010                DISAGREE
004 K811001M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0003
DESCRIPTION:              AGREE/DISAGREE: I AM GOOD AT SCIENCE
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811002              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811002A (01          ) 000                AGREE
002 K811002B (02          ) 100                NOT SURE
003 K811002C (03          ) 010                DISAGREE
004 K811002M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0004
DESCRIPTION:              AGREE/DISAGREE: LEARNING SCI MOSTLY MEMORIZATION
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811003              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811003A (01          ) 000                AGREE
002 K811003B (02          ) 100                NOT SURE
003 K811003C (03          ) 010                DISAGREE
004 K811003M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0005
DESCRIPTION:              AGREE/DISAGREE: SCI USEFUL FOR EVERYDAY PROBLEMS
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811004              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811004A (01          ) 000                AGREE
002 K811004B (02          ) 100                NOT SURE
003 K811004C (03          ) 010                DISAGREE
004 K811004M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0006
DESCRIPTION:              AGREE/DISAGREE: IF CHOICE, WOULD NOT STUDY SCIENCE
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811005              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811005A (01          ) 000                AGREE
002 K811005B (02          ) 100                NOT SURE
003 K811005C (03          ) 010                DISAGREE
004 K811005M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0007
DESCRIPTION:              AGREE/DISAGREE: ALL CAN DO WELL IN SCI IF THEY TRY
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811006              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811006A (01          ) 000                AGREE
002 K811006B (02          ) 100                NOT SURE
003 K811006C (03          ) 010                DISAGREE
004 K811006M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0008
DESCRIPTION:              AGREE/DISAGREE: SCIENCE IS BORING
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811007              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811007A (01          ) 000                AGREE
002 K811007B (02          ) 100                NOT SURE
003 K811007C (03          ) 010                DISAGREE
004 K811007M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:  SUBJ0009
DESCRIPTION:              AGREE/DISAGREE: SCIENCE IS A HARD SUBJECT
GRADES/ASSESSMENTS:       N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                  K811008              TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
TYPE OF CONTRAST:         CLASS                NUMBER OF INDEPENDENT CONTRASTS:         3

001 K811008A (01          ) 000                AGREE
002 K811008B (02          ) 100                NOT SURE
003 K811008C (03          ) 010                DISAGREE
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
004 K811008M (M          ) 001                       MISSING

CONDITIONING VARIABLE ID:  SUBJ0010
DESCRIPTION:               EVER DONE HANDS-ON PROJECT WITH LIVING THINGS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811101                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811101Y (01         ) 0                         YES
002 K811101M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0011
DESCRIPTION:               EVER DONE HANDS-ON PROJECT WITH ELECTRICITY?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811102                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811102Y (01         ) 0                         YES
002 K811102M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0012
DESCRIPTION:               EVER DONE HANDS-ON PROJECT WITH CHEMICALS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811103                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811103Y (01         ) 0                         YES
002 K811103M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0013
DESCRIPTION:               EVER DONE HANDS-ON PROJECT WITH ROCKS OR MINERALS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811104                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811104Y (01         ) 0                         YES
002 K811104M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0014
DESCRIPTION:               DONE HANDS-ON PROJ W/ MAGNIFYING GLASS/MICROSCOPE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811105                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811105Y (01         ) 0                         YES
002 K811105M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0015
DESCRIPTION:               DONE HANDS-ON PROJ W/ THERMOMETER OR BAROMETER?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811106                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811106Y (01         ) 0                         YES
002 K811106M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0016
DESCRIPTION:               EVER DONE HANDS-ON PROJECT WITH SIMPLE MACHINES?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811107                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811107Y (01         ) 0                         YES
002 K811107M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0017
DESCRIPTION:               HAVE DONE HANDS-ON PROJECT WITH NONE OF THE ABOVE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811108                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K811108Y (01         ) 0                         YES
002 K811108M (M          ) 1                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0018
DESCRIPTION:               HOW OFTEN DO YOU STUDY SCIENCE IN SCHOOL?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   K811201                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:            CLASS
                                                NUMBER OF INDEPENDENT CONTRASTS:          5
001 K811201A (01            ) 00000
002 K811201B (02            ) 10000             EVERY DAY
003 K811201C (03            ) 01000             3-4 TIMES A WEEK
004 K811201D (04            ) 00100             1-2 TIMES A WEEK
005 K811201E (05            ) 00010             LESS THEN ONCE WEEK
006 K811201M (M             ) 00001             NEVER
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0019
DESCRIPTION:                 HOW MUCH TIME PER WEEK DOING SCIENCE HOMEWORK?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     K811301
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      7
                                                NUMBER OF INDEPENDENT CONTRASTS:          6
001 K811301A (01            ) 000000
002 K811301B (02            ) 100000            DON'T HAVE SCIENCE
003 K811301C (03            ) 010000            NONE
004 K811301D (04            ) 001000            1/2 HOUR
005 K811301E (05            ) 000100            1 HOUR
006 K811301F (06            ) 000010            2 HOURS
007 K811301M (M             ) 000001            MORE THAN 2 HOURS
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0020
DESCRIPTION:                 DO SCI PROJECTS IN SCHOOL THAT TAKE 1 OR MORE WKS?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     K811401
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
                                                NUMBER OF INDEPENDENT CONTRASTS:          2
001 K811401Y (01            ) 00
002 K811401N (02            ) 10                YES
003 K811401M (M             ) 01                NO
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0021
DESCRIPTION:                 LAST 2 YRS, BEEN IN SCI FAIR, FESTIVAL, SCI DAY?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     K811501
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
                                                NUMBER OF INDEPENDENT CONTRASTS:          2
001 K811501Y (01            ) 00
002 K811501N (02            ) 10                YES
003 K811501M (M             ) 01                NO
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0022
DESCRIPTION:                 FOR SCI IN SCHOOL, HOW OFTEN DO YOU READ TEXTBOOK?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     K811601
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
                                                NUMBER OF INDEPENDENT CONTRASTS:          4
001 K811601A (01            ) 0000
002 K811601B (02            ) 1000              ALMOST EVERY DAY
003 K811601C (03            ) 0100              ONCE OR TWICE A WEEK
004 K811601D (04            ) 0010              ONCE OR TWICE A MTH
005 K811601M (M             ) 0001              NEVER OR HARDLY EVER
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0023
DESCRIPTION:                 FOR SCI IN SCHOOL, HOW OFTEN DO YOU READ MAGS/BKS?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     K811602
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
                                                NUMBER OF INDEPENDENT CONTRASTS:          4
001 K811602A (01            ) 0000
002 K811602B (02            ) 1000              ALMOST EVERY DAY
003 K811602C (03            ) 0100              ONCE OR TWICE A WEEK
004 K811602D (04            ) 0010              ONCE OR TWICE A MTH
005 K811602M (M             ) 0001              NEVER OR HARDLY EVER
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0024
DESCRIPTION:                 FOR SCI IN SCHOOL, HOW OFTEN DISCUSS SCIENCE NEWS?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     K811603
TYPE OF CONTRAST:            CLASS              TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
                                                NUMBER OF INDEPENDENT CONTRASTS:          4
001 K811603A (01            ) 0000
002 K811603B (02            ) 1000              ALMOST EVERY DAY
003 K811603C (03            ) 0100              ONCE OR TWICE A WEEK
004 K811603D (04            ) 0010              ONCE OR TWICE A MTH
005 K811603M (M             ) 0001              NEVER OR HARDLY EVER
                                                MISSING

CONDITIONING VARIABLE ID:    SUBJ0025
DESCRIPTION:                 FOR SCI IN SCHOOL, HOW OFTEN WORK WITH OTHERS?
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811604                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811604A (01        ) 0000                      ALMOST EVERY DAY
002 K811604B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811604C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811604D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811604M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0026
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN GIVE ORAL REPORT?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811605                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811605A (01        ) 0000                      ALMOST EVERY DAY
002 K811605B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811605C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811605D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811605M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0027
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN GIVE WRITTEN REPORT?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811606                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811606A (01        ) 0000                      ALMOST EVERY DAY
002 K811606B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811606C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811606D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811606M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0028
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN DO HANDS-ON PROJECT?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   K811607                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811607A (01        ) 0000                      ALMOST EVERY DAY
002 K811607B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811607C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811607D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811607M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0029
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN DISCUSS RESULTS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   K811608                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811608A (01        ) 0000                      ALMOST EVERY DAY
002 K811608B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811608C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811608D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811608M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0030
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN DO YOU USE COMPUTER?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811609                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811609A (01        ) 0000                      ALMOST EVERY DAY
002 K811609B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811609C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811609D (04        ) 0010                      NEVER OR HARDLY EVER
005 K811609M (M         ) 0001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0031
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN TAKE TEST OR QUIZ?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811610                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811610A (01        ) 0000                      ALMOST EVERY DAY
002 K811610B (02        ) 1000                      ONCE OR TWICE A WEEK
003 K811610C (03        ) 0100                      ONCE OR TWICE A MTH
004 K811610D (04        ) 0010                      NEVER OR HARDLY EVER
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
005 K811610M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0032
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN DO YOU USE LIBRARY?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811611
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811611A (01         ) 0000                          ALMOST EVERY DAY
002 K811611B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811611C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811611D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811611M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0033
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN OBSERVE/MEAS OUTSIDE?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811612
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811612A (01         ) 0000                          ALMOST EVERY DAY
002 K811612B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811612C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811612D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811612M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0034
DESCRIPTION:               HOW OFTEN DOES SCIENCE TEACHER TALK TO CLASS?
GRADES/ASSESSMENTS:        N04, N08  S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811701
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811701A (01         ) 0000                          ALMOST EVERY DAY
002 K811701B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811701C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811701D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811701M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0035
DESCRIPTION:               HOW OFTEN DOES SCIENCE TEACHER DO DEMONSTRATION?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811702
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811702A (01         ) 0000                          ALMOST EVERY DAY
002 K811702B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811702C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811702D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811702M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0036
DESCRIPTION:               HOW OFTEN DOES SCIENCE TEACHER SHOW VIDEO OR TV?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811703
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811703A (01         ) 0000                          ALMOST EVERY DAY
002 K811703B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811703C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811703D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811703M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0037
DESCRIPTION:               HOW OFTEN DOES SCIENCE TEACHER USE COMPUTER?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811704
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4

001 K811704A (01         ) 0000                          ALMOST EVERY DAY
002 K811704B (02         ) 1000                          ONCE OR TWICE A WEEK
003 K811704C (03         ) 0100                          ONCE OR TWICE A MTH
004 K811704D (04         ) 0010                          NEVER OR HARDLY EVER
005 K811704M (M          ) 0001                          MISSING

CONDITIONING VARIABLE ID:  SUBJ0038
DESCRIPTION:               HOW OFTEN DOES SCI TEACHER USE CD'S/LASER DISCS?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   K811705
TYPE OF CONTRAST:          CLASS                         TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
                                                         NUMBER OF INDEPENDENT CONTRASTS:       4
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 K811705A (01            ) 0000                      ALMOST EVERY DAY
002 K811705B (02            ) 1000                      ONCE OR TWICE A WEEK
003 K811705C (03            ) 0100                      ONCE OR TWICE A MTH
004 K811705D (04            ) 0010                      NEVER OR HARDLY EVER
005 K811705M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0039
DESCRIPTION:                HOW OFTEN DOES SCI CLASS GO ON A FIELD TRIP?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    K811801                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        3

001 K811801A (01            ) 000                       3 OR MORE A DAY
002 K811801B (02            ) 100                       1 OR 2 TIMES A YEAR
003 K811801C (03            ) 010                       NEVER OR HARDLY EVER
004 K811801M (M             ) 001                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0040
DESCRIPTION:                HOW OFTEN DOES GUEST SPEAKER COME TO SCI CLASS?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    K811901                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        3

001 K811901A (01            ) 000                       3 OR MORE A DAY
002 K811901B (02            ) 100                       1 OR 2 TIMES A YEAR
003 K811901C (03            ) 010                       NEVER OR HARDLY EVER
004 K811901M (M             ) 001                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0041
DESCRIPTION:                ABOUT HOW MANY QUESTIONS RIGHT ON TEST?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    SM00101                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 SM00101A (01            ) 0000                      ALMOST ALL
002 SM00101B (02            ) 1000                      MORE THAN HALF
003 SM00101C (03            ) 0100                      ABOUT HALF
004 SM00101D (04            ) 0010                      LESS THAN HALF
005 SM00101M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0042
DESCRIPTION:                HOW HARD TEST COMPARED TO THOSE IN SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    SM00201                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 SM00201A (01            ) 0000                      MUCH HARDER
002 SM00201B (02            ) 1000                      HARDER THAN OTHERS
003 SM00201C (03            ) 0100                      ABOUT THE SAME
004 SM00201D (04            ) 0010                      EASIER THEN OTHES
005 SM00201M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0043
DESCRIPTION:                HOW HARD DID YOU TRY ON TEST COMPARED TO OTHERS?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    SM00301                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 SM00301A (01            ) 0000                      MUCH HARDER
002 SM00301B (02            ) 1000                      HARDER THAN OTHERS
003 SM00301C (03            ) 0100                      ABOUT AS HARD
004 SM00301D (04            ) 0010                      NOT AS HARD AS OTHER
005 SM00301M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0044
DESCRIPTION:                HOW IMPORTANT WAS IT YOU DO WELL ON THIS TEST?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    SM00401                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 SM00401A (01            ) 0000                      VERY IMPORTANT
002 SM00401B (02            ) 1000                      IMPORTANT
003 SM00401C (03            ) 0100                      SOMEWHAT IMPORTANT
004 SM00401D (04            ) 0010                      NOT VERY IMPORTANTER
005 SM00401M (M             ) 0001                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0045
DESCRIPTION:                HOW OFTEN HAD TO WRITE LONG ANSWERS TO QSTS?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    SM00501                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:              CLASS                  NUMBER OF INDEPENDENT CONTRASTS:          4

001 SM00501A (01           ) 0000                     AT LEAST ONCE A WEEK
002 SM00501B (02           ) 1000                     ONCE OR TWICE A MNTH
003 SM00501C (03           ) 0100                     ONCE OR TWICE A YEAR
004 SM00501D (04           ) 0010                     NEVERERY IMPORTANTER
005 SM00501M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    BACK0079
DESCRIPTION:                 DESCRIBE YOUR OVERALL GRADES SINCE 6TH GRADE
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     B009701                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      7
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          6

001 B009701A (01           ) 000000                   MOSTLY A'S
002 B009701B (02           ) 100000                   MOSTLY B'S
003 B009701C (03           ) 010000                   MOSTLY C'S
004 B009701D (04           ) 001000                   MOSTLY D'S
005 B009701E (05           ) 000100                   MOSTLY BELOW D'S
006 B009701F (06           ) 000010                   CLASSES NOT GRADED
007 B009701M (M            ) 000001                   MISSING

CONDITIONING VARIABLE ID:    BACK0080
DESCRIPTION:                 HOW FAR IN SCHOOL DO YOU THINK YOU WILL GO?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     B009801                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      7
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          6

001 B009801A (01           ) 000000                   NOT FINISH HS
002 B009801B (02           ) 100000                   GRADUATE HS
003 B009801C (03           ) 010000                   SOME ED PAST HS
004 B009801D (04           ) 001000                   GRADUATE COLLEGE
005 B009801E (05           ) 000100                   GO GRADUATE SCHOOL
006 B009801F (06           ) 000010                   I DON'T KNOW
007 B009801M (M            ) 000001                   MISSING

CONDITIONING VARIABLE ID:    BACK0083
DESCRIPTION:                 DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     B009601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          4

001 B009601A (01           ) 0000                     YES, FULL-TIME
002 B009601B (02           ) 1000                     YES, PART-TIME
003 B009601N (03           ) 0100                     NO
004 B009601D (04           ) 0010                     DON'T LIVE W/ MOTHER
005 B009601E (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    BACK0084
DESCRIPTION:                 DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     B009602                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          4

001 B009602A (01           ) 0000                     YES, FULL-TIME
002 B009602B (02           ) 1000                     YES, PART-TIME
003 B009602N (03           ) 0100                     NO
004 B009602D (04           ) 0010                     DON'T LIVE W/ FATHER
005 B009602M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SUBJ0046
DESCRIPTION:                 DO YOU/TEACHER SAVE YOUR SCI WORK IN A PORTFOLIO?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     K812101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          2

001 K812101Y (01           ) 00                       YES
002 K812101N (02           ) 10                       NO
003 K812101M (M            ) 01                       MISSING

CONDITIONING VARIABLE ID:    SUBJ0047
DESCRIPTION:                 HOW MUCH TIME WEEKLY SPENT ON SCIENCE HOMEWORK?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812201                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          7

001 K812201A (01           ) 0000000                  NOT TAKING SCIENCE
002 K812201B (02           ) 1000000                  NONE
003 K812201C (03           ) 0100000                  1/2 HOUR
004 K812201D (04           ) 0010000                  1 HOUR
005 K812201E (05           ) 0001000                  2 HOURS
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
006 K812201F (06        ) 0000100                      3 HOURS
007 K812201G (07        ) 0000010                      MORE THAN 3 HOURS
008 K812201M (M         ) 0000001                      MISSING

CONDITIONING VARIABLE ID:  SUBJ0048
DESCRIPTION:               FOR SCI IN SCHOOL, HOW OFTEN HANDS-ON ACTIVITIES?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
NAEP ID:                   K811613                     NUMBER OF INDEPENDENT CONTRASTS:         4
TYPE OF CONTRAST:          CLASS

001 K811613A (01        ) 0000                         ALMOST EVERY DAY
002 K811613B (02        ) 1000                         ONCE OR TWICE A WEEK
003 K811613C (03        ) 0100                         ONCE OR TWICE A MTH
004 K811613D (04        ) 0010                         NEVER OR HARDLY EVER
005 K811613M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0049
DESCRIPTION:               FOR SCI, HOW OFTEN DISCUSS HANDS-ON RESULTS?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
NAEP ID:                   K811614                     NUMBER OF INDEPENDENT CONTRASTS:         4
TYPE OF CONTRAST:          CLASS

001 K811614A (01        ) 0000                         ALMOST EVERY DAY
002 K811614B (02        ) 1000                         ONCE OR TWICE A WEEK
003 K811614C (03        ) 0100                         ONCE OR TWICE A MTH
004 K811614D (04        ) 0010                         NEVER OR HARDLY EVER
005 K811614M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  SUBJ0050
DESCRIPTION:               FOR SCI, DESIGN & CARRY OUT OWN INVESTIGATION?
GRADES/ASSESSMENTS:        N08, S08, N12
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
NAEP ID:                   K811615                     NUMBER OF INDEPENDENT CONTRASTS:         4
TYPE OF CONTRAST:          CLASS

001 K811615A (01        ) 0000                         ALMOST EVERY DAY
002 K811615B (02        ) 1000                         ONCE OR TWICE A WEEK
003 K811615C (03        ) 0100                         ONCE OR TWICE A MTH
004 K811615D (04        ) 0010                         NEVER OR HARDLY EVER
005 K811615M (M         ) 0001                         MISSING

CONDITIONING VARIABLE ID:  BACK0081
DESCRIPTION:               DOES YOUR STEP/MOTHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
NAEP ID:                   B009501                     NUMBER OF INDEPENDENT CONTRASTS:         3
TYPE OF CONTRAST:          CLASS

001 B009501Y (01        ) 000                          YES
002 B009501N (02        ) 100                          NO
003 B009501C (03        ) 010                          DON'T LIVE W/ MOTHER
004 B009501M (M         ) 001                          MISSING

CONDITIONING VARIABLE ID:  BACK0082
DESCRIPTION:               DOES YOUR STEP/FATHER WORK AT A JOB FOR PAY?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     4
NAEP ID:                   B009502                     NUMBER OF INDEPENDENT CONTRASTS:         3
TYPE OF CONTRAST:          CLASS

001 B009502Y (01        ) 000                          YES
002 B009502N (02        ) 100                          NO
003 B009502C (03        ) 010                          DON'T LIVE W/ FATHER
004 B009502M (M         ) 001                          MISSING

CONDITIONING VARIABLE ID:  BACK0085
DESCRIPTION:               SINCE KDG, GRADES ATTENDED IN THIS STATE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     6
NAEP ID:                   B008301                     NUMBER OF INDEPENDENT CONTRASTS:         5
TYPE OF CONTRAST:          CLASS

001 B008301A (01        ) 00000                        LESS THAN 1 GRADE
002 B008301B (02        ) 10000                        1-2 GRADES
003 B008301C (03        ) 01000                        3-5 GRADES
004 B008301D (04        ) 00100                        6-9 GRADES
005 B008301E (05        ) 00010                        MORE THAN 9 GRADES
006 B008301M (M         ) 00001                        MISSING

CONDITIONING VARIABLE ID:  BACK0086
DESCRIPTION:               DESCRIBE YOUR OVERALL GRADES SINCE 9TH GRADE
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:                                TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
NAEP ID:                   B009901                     NUMBER OF INDEPENDENT CONTRASTS:         6
TYPE OF CONTRAST:          CLASS
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 B009901A (01        ) 000000                   MOSTLY A'S
002 B009901B (02        ) 100000                   MOSTLY B'S
003 B009901C (03        ) 010000                   MOSTLY C'S
004 B009901D (04        ) 001000                   MOSTLY D'S
005 B009901E (05        ) 000100                   MOSTLY BELOW D'S
006 B009901F (06        ) 000010                   CLASSES NOT GRADED
007 B009901M (M         ) 000001                   MISSING

CONDITIONING VARIABLE ID:  BACK0087
DESCRIPTION:               WHICH BEST DESCRIBES YOUR HIGH SCHOOL PROGRAM
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B008501                 TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:         4

001 B008501A (01        ) 0000                     GENERAL
002 B008501B (02        ) 1000                     ACADEMIC/COLLEGE PRE
003 B008501C (03        ) 0100                     VOCATIONAL OR TECHN
004 B008501D (04        ) 0010                     OTHER
005 B008501M (M         ) 0001                     MISSING

CONDITIONING VARIABLE ID:  BACK0088
DESCRIPTION:               WHAT WILL TAKE LARGEST AMT. OF TIME AFTER HIGH-SCH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B005501                 TOTAL NUMBER OF SPECIFIED CONTRASTS:     7
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:         6

001 B005501A (01        ) 000000                   WORKING FULL-TIME
002 B005501B (02        ) 100000                   VOCA/TECH/BUSINESS
003 B005501C (03        ) 010000                   ATTEND 2 YR COLLEGE
004 B005501D (04        ) 001000                   ATTEND 4YR COLLEGE
005 B005501E (05        ) 000100                   SERVING IN MILITARY
006 B005501F (06        ) 000010                   OTHER
007 B005501M (M         ) 000001                   MISSING

CONDITIONING VARIABLE ID:  BACK0089
DESCRIPTION:               KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   MOTHOCC                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    17
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        16

001 NOT PRE  (01,M      ) 0000000000000000         NOT PRESENT IN HOUSEHOLD
002 OFFICE W (02        ) 1000000000000000         OFFICE WORKER
003 TECHNIC  (03        ) 0100000000000000         TECHNICAL
004 PROT SRV (04        ) 0010000000000000         PROTECTIVE SERVICE
005 SALES    (05        ) 0001000000000000         SALES
006 OWNER    (06        ) 0000100000000000         OWNER
007 SERV WRK (07        ) 0000010000000000         SERVICE WORKER
008 SKILL T  (08        ) 0000001000000000         SKILLED TRADESPERSON
009 LABORER  (09        ) 0000000100000000         LABORER
010 OPERATOR (10        ) 0000000010000000         OPERATOR
011 FARMER   (11        ) 0000000001000000         FARMER/FARM MANAGER
012 HOMEMAKE (12        ) 0000000000100000         HOMEMAKER
013 MANAGER  (13        ) 0000000000010000         MANAGER
014 MILITARY (14        ) 0000000000001000         MILITARY
015 TEACHER  (15        ) 0000000000000100         SCHOOL TEACHER
016 PROFESS1 (16        ) 0000000000000010         PROFESSIONAL 1
017 PROFESS2 (17        ) 0000000000000001         PROFESSIONAL 2

CONDITIONING VARIABLE ID:  BACK0090
DESCRIPTION:               KIND OF WORK DONE BY YOUR MOTHER/FEMALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   B011A01                 TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:         1

001 B011A01M (M         ) 0                        MISSING
002 B011A01N (0         ) 1                        NOT PRESENT IN HOUSEHOLD

CONDITIONING VARIABLE ID:  BACK0091
DESCRIPTION:               KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   FATHOCC                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    17
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        16

001 NOT PRES (01,M      ) 0000000000000000         NOT PRESENT IN HOUSEHOLD
002 OFFICE   (02        ) 1000000000000000         OFFICE WORKER
003 TECHNIC  (03        ) 0100000000000000         TECHNICAL
004 PROT SRV (04        ) 0010000000000000         PROTECTIVE SERVICES
005 SALES    (05        ) 0001000000000000         SALES
006 OWNER    (06        ) 0000100000000000         OWNER
007 SERV WRK (07        ) 0000010000000000         SERVICE WORKER
008 SKILL TR (08        ) 0000001000000000         SKILLED TRADEPERSON
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
009 LABORER  (09          ) 0000000100000000        LABORER
010 OPERATOR (10          ) 0000000010000000        OPERATOR
011 FARMER   (11          ) 0000000001000000        FARMER/FARM MANAGER
012 HOMEMAKE (12          ) 0000000000100000        HOMEMAKER
013 MANAGER  (13          ) 0000000000010000        MANAGER
014 MILITARY (14          ) 0000000000001000        MILITARY
015 TEACHER  (15          ) 0000000000000100        SCHOOL TEACHER
016 PROFESS1 (16          ) 0000000000000010        PROFESSIONAL 1
017 PROFESS2 (17          ) 0000000000000001        PROFESSIONAL 2

CONDITIONING VARIABLE ID:   BACK0092
DESCRIPTION:                KIND OF WORK DONE BY YOUR FATHER/MALE GUARDIAN?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    B012A02                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 B012A02M (M           ) 0                       MISSING
002 B012A02N (@           ) 1                       NOT PRESENT IN HOUSEHOLD

CONDITIONING VARIABLE ID:   SUBJ0051
DESCRIPTION:                DONE SCHOOL SCI INVEST/PROJECTS W/ LIVING THINGS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812301                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812301Y (01          ) 0                       YES
002 K812301M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0052
DESCRIPTION:                DONE SCHOOL SCI INVEST/PROJECTS W/ ELECTRICITY?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812302                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812302Y (01          ) 0                       YES
002 K812302M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0053
DESCRIPTION:                DONE SCHOOL SCI INVEST/PROJECTS W/ CHEMICALS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812303                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812303Y (01          ) 0                       YES
002 K812303M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0054
DESCRIPTION:                DONE SCHOOL SCI INVEST/PROJECTS W/ ROCKS/MINERALS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812304                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812304Y (01          ) 0                       YES
002 K812304M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0055
DESCRIPTION:                DONE SCI INVEST/PROJECTS W/ MAG. GLASS/MICROSCOPE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812305                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812305Y (01          ) 0                       YES
002 K812305M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0056
DESCRIPTION:                DONE SCI INVEST/PROJECTS W/ THERMOMETER/BAROMETER?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812306                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS

001 K812306Y (01          ) 0                       YES
002 K812306M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:   SUBJ0057
DESCRIPTION:                DONE SCI INVEST/PROJECTS W/ SIMPLE MACHINES?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:                             TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
NAEP ID:                    K812307                 NUMBER OF INDEPENDENT CONTRASTS:        1
TYPE OF CONTRAST:           CLASS
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 K812307Y (01          ) 0                        YES
002 K812307M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  SUBJ0058
DESCRIPTION:               DONE SCI PROJECTS W/ INSTRUMENTS MEAS. SPEED?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812308
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K812308Y (01          ) 0                        YES
002 K812308M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  SUBJ0059
DESCRIPTION:               DONE SCHOOL SCI INVEST/PROJECTS W/ NONE OF ABOVE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812309
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 K812309Y (01          ) 0                        YES
002 K812309M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  SUBJ0060
DESCRIPTION:               ARE YOU TAKING A SCIENCE COURSE THIS YEAR?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812401
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                     NUMBER OF INDEPENDENT CONTRASTS:        2

001 K812401Y (01          ) 00                       YES
002 K812401N (02          ) 10                       NO
003 K812401M (M           ) 01                       MISSING

CONDITIONING VARIABLE ID:  SUBJ0061
DESCRIPTION:               SINCE 9TH GRADE, HOW MUCH GENERAL SCIENCE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812501
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812501A (01          ) 0000                     MORE THAN 1 YEAR
002 K812501B (02          ) 1000                     1 YEAR
003 K812501C (03          ) 0100                     LESS THAN 1 YEAR
004 K812501D (04          ) 0010                     NONE
005 K812501M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0062
DESCRIPTION:               SINCE 9TH GRADE, HOW MUCH EARTH & SPACE SCIENCE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812502
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812502A (01          ) 0000                     MORE THAN 1 YEAR
002 K812502B (02          ) 1000                     1 YEAR
003 K812502C (03          ) 0100                     LESS THAN 1 YEAR
004 K812502D (04          ) 0010                     NONE
005 K812502M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0063
DESCRIPTION:               SINCE 9TH GRADE, HOW MUCH BIOLOGY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812503
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812503A (01          ) 0000                     MORE THAN 1 YEAR
002 K812503B (02          ) 1000                     1 YEAR
003 K812503C (03          ) 0100                     LESS THAN 1 YEAR
004 K812503D (04          ) 0010                     NONE
005 K812503M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0064
DESCRIPTION:               SINCE 9TH GRADE, HOW MUCH LIFE SCIENCE (NOT BIO)?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   K812504
TYPE OF CONTRAST:          CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
                                                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812504A (01          ) 0000                     MORE THAN 1 YEAR
002 K812504B (02          ) 1000                     1 YEAR
003 K812504C (03          ) 0100                     LESS THAN 1 YEAR
004 K812504D (04          ) 0010                     NONE
005 K812504M (M           ) 0001                     MISSING

CONDITIONING VARIABLE ID:  SUBJ0065
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 SINCE 9TH GRADE, HOW MUCH CHEMISTRY?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812505                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812505A (01          ) 0000                      MORE THAN 1 YEAR
002 K812505B (02          ) 1000                      1 YEAR
003 K812505C (03          ) 0100                      LESS THAN 1 YEAR
004 K812505D (04          ) 0010                      NONE
005 K812505M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0066
DESCRIPTION:                 SINCE 9TH GRADE, HOW MUCH PHYSICS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812506                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812506A (01          ) 0000                      MORE THAN 1 YEAR
002 K812506B (02          ) 1000                      1 YEAR
003 K812506C (03          ) 0100                      LESS THAN 1 YEAR
004 K812506D (04          ) 0010                      NONE
005 K812506M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0067
DESCRIPTION:                 SINCE 9TH GRADE, HOW MUCH OTHER PHYSICAL SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812507                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812507A (01          ) 0000                      MORE THAN 1 YEAR
002 K812507B (02          ) 1000                      1 YEAR
003 K812507C (03          ) 0100                      LESS THAN 1 YEAR
004 K812507D (04          ) 0010                      NONE
005 K812507M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0068
DESCRIPTION:                 SINCE 9TH GRADE, HOW MUCH INTEGRATED SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812508                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812508A (01          ) 0000                      MORE THAN 1 YEAR
002 K812508B (02          ) 1000                      1 YEAR
003 K812508C (03          ) 0100                      LESS THAN 1 YEAR
004 K812508D (04          ) 0010                      NONE
005 K812508M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0069
DESCRIPTION:                 SINCE 9TH GRADE, HOW MUCH SCIENCE AND TECHNOLOGY?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812509                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812509A (01          ) 0000                      MORE THAN 1 YEAR
002 K812509B (02          ) 1000                      1 YEAR
003 K812509C (03          ) 0100                      LESS THAN 1 YEAR
004 K812509D (04          ) 0010                      NONE
005 K812509M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0070
DESCRIPTION:                 SINCE 9TH GRADE, HOW MANY OTHER SCIENCE COURSES?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812510                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 K812510A (01          ) 0000                      MORE THAN 1 YEAR
002 K812510B (02          ) 1000                      1 YEAR
003 K812510C (03          ) 0100                      LESS THAN 1 YEAR
004 K812510D (04          ) 0010                      NONE
005 K812510M (M           ) 0001                      MISSING

CONDITIONING VARIABLE ID:    SUBJ0071
DESCRIPTION:                 ENROLLED IN SCIENCE ADVANCED PLACEMENT COURSE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     K812601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        2

001 K812601Y (01          ) 00                        YES
002 K812601N (02          ) 10                        NO
003 K812601M (M           ) 01                        MISSING
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VARIABLE ID:   SUBJ0072
DESCRIPTION:                DONE SCI INVEST/PROJECTS IN SCHOOL 1 WK OR MORE?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    K812701                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        2

001 K812701Y (01          ) 00                      YES
002 K812701N (02          ) 10                      NO
003 K812701M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:   SUBJ0073
DESCRIPTION:                HOW OFTEN ANALYZE OWN SCI DATA, FORM CONCLUSIONS?
GRADES/ASSESSMENTS:         N12
CONDITIONING VAR LABEL:
NAEP ID:                    K811616                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 K811616A (01          ) 0000                    ALMOST EVERY DAY
002 K811616B (02          ) 1000                    ONCE OR TWICE A WEEK
003 K811616C (03          ) 0100                    ONCE OR TWICE A MTH
004 K811616D (04          ) 0010                    NEVER OR HARDLY EVER
005 K811616M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0003
DESCRIPTION:                BEST DESCRIBES HOW 4TH GR ARE ORGANIZED?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C030901                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 C030901A (01          ) 000                     SELF CONTAINED
002 C030901B (02          ) 100                     DEPARTMENTALIZED
003 C030901C (03          ) 010                     REGROUPED
004 C030901M (M           ) 001                     MISSING

CONDITIONING VARIABLE ID:   SCHL0004
DESCRIPTION:                4TH GRADERS ASSIGNED BY ABILITY/ACHIEVEMENT LEVEL?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C037101                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037101A (01          ) 0000                    YES, BY MATH ABILITY
002 C037101B (02          ) 1000                    YES, READING ABILITY
003 C037101C (03          ) 0100                    YES, GENERAL ABILITY
004 C037101N (04          ) 0010                    NO
005 C037101M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0005
DESCRIPTION:                HOW OFTEN IS 4TH-GRADER INSTRUCTED IN MATH?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C031212                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031212A (01          ) 00000                   EVERY DAY
002 C031212B (02          ) 10000                   THREE OR FOUR/WEEK
003 C031212C (03          ) 01000                   ONCE OR TWICE A WEEK
004 C031212D (04          ) 00100                   LESS THAN ONCE/WEEK
005 C031212E (05          ) 00010                   SUBJECT NOT TAUGHT
006 C031212M (M           ) 00001                   MISSING

CONDITIONING VARIABLE ID:   SCHL0006
DESCRIPTION:                HOW OFTEN IS 4TH-GRADER INSTRUCTED IN SCIENCE?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C031205                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031205A (01          ) 00000                   EVERY DAY
002 C031205B (02          ) 10000                   THREE OR FOUR/WEEK
003 C031205C (03          ) 01000                   ONCE OR TWICE A WEEK
004 C031205D (04          ) 00100                   LESS THAN ONCE/WEEK
005 C031205E (05          ) 00010                   SUBJECT NOT TAUGHT
006 C031205M (M           ) 00001                   MISSING

CONDITIONING VARIABLE ID:   SCHL0007
DESCRIPTION:                HOW OFTEN IS 4TH-GRADER INSTRUCTED IN READING?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C031213                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031213A (01          ) 00000                   EVERY DAY
002 C031213B (02          ) 10000                   THREE OR FOUR/WEEK
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
003 C031213C (03          ) 01000                  ONCE OR TWICE A WEEK
004 C031213D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C031213E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C031213M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0008
DESCRIPTION:                HOW OFTEN IS 4TH-GRADER INSTRUCTED IN ARTS?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C031214                TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        5

001 C031214A (01          ) 00000                  EVERY DAY
002 C031214B (02          ) 10000                  THREE OR FOUR/WEEK
003 C031214C (03          ) 01000                  ONCE OR TWICE A WEEK
004 C031214D (04          ) 00100                  LESS THAN ONCE/WEEK
005 C031214E (05          ) 00010                  SUBJECT NOT TAUGHT
006 C031214M (M           ) 00001                  MISSING

CONDITIONING VARIABLE ID:   SCHL0009
DESCRIPTION:                HAS MATH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C031603                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031603Y (01          ) 00                     YES
002 C031603N (02          ) 10                     NO
003 C031603M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0010
DESCRIPTION:                HAS SCIENCE BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C031607                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031607Y (01          ) 00                     YES
002 C031607N (02          ) 10                     NO
003 C031607M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0011
DESCRIPTION:                HAS READING BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    C031601                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031601Y (01          ) 00                     YES
002 C031601N (02          ) 10                     NO
003 C031601M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0012
DESCRIPTION:                HAS ARTS BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C031610                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031610Y (01          ) 00                     YES
002 C031610N (02          ) 10                     NO
003 C031610M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0013
DESCRIPTION:                HAS SUBJECT INTEGRATION BEEN A PRIORITY?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C031606                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C031606Y (01          ) 00                     YES
002 C031606N (02          ) 10                     NO
003 C031606M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0014
DESCRIPTION:                COMPUTERS AVAILABLE ALL THE TIME IN CLASSROOM?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C035701                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035701Y (01          ) 00                     YES
002 C035701N (02          ) 10                     NO
003 C035701M (M           ) 01                     MISSING

CONDITIONING VARIABLE ID:   SCHL0015
DESCRIPTION:                COMPUTERS GROUPED IN SEPARATE LAB AND AVAILABLE?
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C035702                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035702Y (01       ) 00                              YES
002 C035702N (02       ) 10                              NO
003 C035702M (M        ) 01                              MISSING

CONDITIONING VARIABLE ID:    SCHL0016
DESCRIPTION:                 COMPUTERS AVAILABLE TO BRING TO ROOM WHEN NEEDED?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C035703                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C035703Y (01       ) 00                              YES
002 C035703N (02       ) 10                              NO
003 C035703M (M        ) 01                              MISSING

CONDITIONING VARIABLE ID:    SCHL0017
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON MATH?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037201                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037201Y (01       ) 0                               YES
002 C037201M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0018
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON SCIENCE?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037202                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037202Y (01       ) 0                               YES
002 C037202M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0019
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON MATH?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037207                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037207Y (01       ) 0                               YES
002 C037207M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0020
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON ARTS?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037204                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037204Y (01       ) 0                               YES
002 C037204M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0021
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON OTHER?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037205                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037205Y (01       ) 0                               YES
002 C037205M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0022
DESCRIPTION:                 SCHOOL NOT A SPECIAL FOCUS SCHOOL?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037206                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037206Y (01       ) 0                               YES
002 C037206M (M        ) 1                               MISSING

CONDITIONING VARIABLE ID:    SCHL0023
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE MATH CURRICULUM?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037301                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 C037301Y (01         ) 0                                YES
002 C037301M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0024
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE SCIENCE CURRICULUM?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037302                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037302Y (01         ) 0                                YES
002 C037302M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0025
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE READING CURRICULUM?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037303                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037303Y (01         ) 0                                YES
002 C037303M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0026
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE ARTS CURRICULUM?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037304                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037304Y (01         ) 0                                YES
002 C037304M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0027
DESCRIPTION:               SCHOOL FOLLOW DISTRICT/STATE FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037305                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037305Y (01         ) 0                                YES
002 C037305M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0028
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037401                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037401Y (01         ) 0                                YES
002 C037401M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0029
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037402                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037402Y (01         ) 0                                YES
002 C037402M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0030
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037403                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037403Y (01         ) 0                                YES
002 C037403M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0031
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037404                          TOTAL NUMBER OF SPECIFIED CONTRASTS:     2
TYPE OF CONTRAST:          CLASS                            NUMBER OF INDEPENDENT CONTRASTS:         1

001 C037404Y (01         ) 0                                YES
002 C037404M (M          ) 1                                MISSING

CONDITIONING VARIABLE ID:  SCHL0032
DESCRIPTION:               SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
NAEP ID:                     C037405                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037405Y (01           ) 0                          YES
002 C037405M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0033
DESCRIPTION:                 SCHOOL SPONSER 4TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037406                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037406Y (01           ) 0                          YES
002 C037406M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0034
DESCRIPTION:                 4TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037501Y (01           ) 0                          YES
002 C037501M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0035
DESCRIPTION:                 4TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037502                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037502Y (01           ) 0                          YES
002 C037502M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0036
DESCRIPTION:                 4TH GRADERS IN EXTRACURR ACTS FOR READING?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037503                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037503Y (01           ) 0                          YES
002 C037503M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0037
DESCRIPTION:                 4TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037504                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037504Y (01           ) 0                          YES
002 C037504M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0038
DESCRIPTION:                 4TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037505                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037505Y (01           ) 0                          YES
002 C037505M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0039
DESCRIPTION:                 4TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037601                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037601Y (01           ) 0                          YES
002 C037601M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0040
DESCRIPTION:                 4TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037602                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037602Y (01           ) 0                          YES
002 C037602M (M            ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0041
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 4TH GRADERS IN SUMMER PROGRAMS IN READING?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037603                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037603Y (01         ) 0                           YES
002 C037603M (M          ) 1                           MISSING

CONDITIONING VARIABLE ID:    SCHL0042
DESCRIPTION:                 4TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037604                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037604Y (01         ) 0                           YES
002 C037604M (M          ) 1                           MISSING

CONDITIONING VARIABLE ID:    SCHL0043
DESCRIPTION:                 4TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     C037605                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 C037605Y (01         ) 0                           YES
002 C037605M (M          ) 1                           MISSING

CONDITIONING VARIABLE ID:    SCHL0044
DESCRIPTION:                 WHICH BEST DESCRIBES PRIMARY WAY LIBRARY STAFFED?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C036601                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        4

001 C036601A (01         ) 0000                        NO LIBRARY IN SCHOOL
002 C036601B (02         ) 1000                        LIBRARY-NO/VOL STAFF
003 C036601C (03         ) 0100                        PART-TIME STAFF
004 C036601D (04         ) 0010                        FULL-TIME STAFF
005 C036601M (M          ) 0001                        MISSING

CONDITIONING VARIABLE ID:    SCHL0045
DESCRIPTION:                 INVOLVE PARENTS AS AIDES IN CLASSROOM?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032207                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032207A (01         ) 000                         YES, ROUTINELY
002 C032207B (02         ) 100                         YES, OCCASIONALLY
003 C032207N (03         ) 010                         NO
004 C032207M (M          ) 001                         MISSING

CONDITIONING VARIABLE ID:    SCHL0046
DESCRIPTION:                 HAVE PARENTS REVIEW/SIGN HOMEWORK?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032209                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032209A (01         ) 000                         YES, ROUTINELY
002 C032209B (02         ) 100                         YES, OCCASIONALLY
003 C032209N (03         ) 010                         NO
004 C032209M (M          ) 001                         MISSING

CONDITIONING VARIABLE ID:    SCHL0047
DESCRIPTION:                 ASSIGN HOMEWORK STUDENTS DO WITH PARENTS?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032210                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032210A (01         ) 000                         YES, ROUTINELY
002 C032210B (02         ) 100                         YES, OCCASIONALLY
003 C032210N (03         ) 010                         NO
004 C032210M (M          ) 001                         MISSING

CONDITIONING VARIABLE ID:    SCHL0048
DESCRIPTION:                 HAVE A PARENT VOLUNTEER PROGRAM?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032211                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:            CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        3

001 C032211A (01         ) 000                         YES, ROUTINELY
002 C032211B (02         ) 100                         YES, OCCASIONALLY
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
003 C032211N (03            ) 010
004 C032211M (M             ) 001                           NO
                                                            MISSING

CONDITIONING VARIABLE ID:   SCHL0049
DESCRIPTION:                WHAT % OF PARENTS IN PARENT-TEACHER ORGS?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037701                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037701A (01            ) 0000                          0-25%
002 C037701B (02            ) 1000                          26-50%
003 C037701C (03            ) 0100                          51-75%
004 C037701D (04            ) 0010                          76-100%
005 C037701M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0050
DESCRIPTION:                WHAT % OF PARENTS IN OPEN HOUSE/BACK SCHOOL NIGHT?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037702                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037702A (01            ) 0000                          0-25%
002 C037702B (02            ) 1000                          26-50%
003 C037702C (03            ) 0100                          51-75%
004 C037702D (04            ) 0010                          76-100%
005 C037702M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0051
DESCRIPTION:                WHAT % OF PARENTS IN PARENT-TEACHER COMFERENCES?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037703                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037703A (01            ) 0000                          0-25%
002 C037703B (02            ) 1000                          26-50%
003 C037703C (03            ) 0100                          51-75%
004 C037703D (04            ) 0010                          76-100%
005 C037703M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0052
DESCRIPTION:                WHAT % PARENTS INVOLVED MAKING CURRICULUM DECISION
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037704                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037704A (01            ) 0000                          0-25%
002 C037704B (02            ) 1000                          26-50%
003 C037704C (03            ) 0100                          51-75%
004 C037704D (04            ) 0010                          76-100%
005 C037704M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0053
DESCRIPTION:                WHAT % OF PARENTS IN VOLUNTEER PROGRAMS?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C037705                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C037705A (01            ) 0000                          0-25%
002 C037705B (02            ) 1000                          26-50%
003 C037705C (03            ) 0100                          51-75%
004 C037705D (04            ) 0010                          76-100%
005 C037705M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0054
DESCRIPTION:                IS STUDENT ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032402                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032402A (01            ) 0000                          SERIOUS
002 C032402B (02            ) 1000                          MODERATE
003 C032402C (03            ) 0100                          MINOR
004 C032402D (04            ) 0010                          NOT A PROBLEM
005 C032402M (M             ) 0001                          MISSING

CONDITIONING VARIABLE ID:   SCHL0055
DESCRIPTION:                IS STUDENT TARDINESS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032401                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        4
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 C032401A (01          ) 0000                    SERIOUS
002 C032401B (02          ) 1000                    MODERATE
003 C032401C (03          ) 0100                    MINOR
004 C032401D (04          ) 0010                    NOT A PROBLEM
005 C032401M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0056
DESCRIPTION:                ARE PHYSICAL CONFLICTS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032404                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032404A (01         .) 0000                    SERIOUS
002 C032404B (02          ) 1000                    MODERATE
003 C032404C (03          ) 0100                    MINOR
004 C032404D (04          ) 0010                    NOT A PROBLEM
005 C032404M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0057
DESCRIPTION:                IS TEACHER ABSENTEEISM A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032406                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032406A (01          ) 0000                    SERIOUS
002 C032406B (02          ) 1000                    MODERATE
003 C032406C (03          ) 0100                    MINOR
004 C032406D (04          ) 0010                    NOT A PROBLEM
005 C032406M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0058
DESCRIPTION:                ARE RACE/CULT. CONFLICTS A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032407                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032407A (01          ) 0000                    SERIOUS
002 C032407B (02          ) 1000                    MODERATE
003 C032407C (03          ) 0100                    MINOR
004 C032407D (04          ) 0010                    NOT A PROBLEM
005 C032407M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0059
DESCRIPTION:                IS STUDENT HEALTH A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032408                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032408A (01          ) 0000                    SERIOUS
002 C032408B (02          ) 1000                    MODERATE
003 C032408C (03          ) 0100                    MINOR
004 C032408D (04          ) 0010                    NOT A PROBLEM
005 C032408M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0060
DESCRIPTION:                IS LACK OF PARENT INVLMT A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032409                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032409A (01          ) 0000                    SERIOUS
002 C032409B (02          ) 1000                    MODERATE
003 C032409C (03          ) 0100                    MINOR
004 C032409D (04          ) 0010                    NOT A PROBLEM
005 C032409M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0061
DESCRIPTION:                IS STUD USE OF ALCOHOL A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:         N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                    C032410                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:           CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        4

001 C032410A (01          ) 0000                    SERIOUS
002 C032410B (02          ) 1000                    MODERATE
003 C032410C (03          ) 0100                    MINOR
004 C032410D (04          ) 0010                    NOT A PROBLEM
005 C032410M (M           ) 0001                    MISSING

CONDITIONING VARIABLE ID:   SCHL0062
DESCRIPTION:                IS STUDENT TOBACCO USE A PROBLEM IN YOUR SCHOOL?
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032411                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032411A (01           ) 0000                     SERIOUS
002 C032411B (02           ) 1000                     MODERATE
003 C032411C (03           ) 0100                     MINOR
004 C032411D (04           ) 0010                     NOT A PROBLEM
005 C032411M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0063
DESCRIPTION:                 IS STUDENT DRUG USE A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032412                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032412A (01           ) 0000                     SERIOUS
002 C032412B (02           ) 1000                     MODERATE
003 C032412C (03           ) 0100                     MINOR
004 C032412D (04           ) 0010                     NOT A PROBLEM
005 C032412M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0064
DESCRIPTION:                 ARE GANG ACTIVITIES A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032413                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032413A (01           ) 0000                     SERIOUS
002 C032413B (02           ) 1000                     MODERATE
003 C032413C (03           ) 0100                     MINOR
004 C032413D (04           ) 0010                     NOT A PROBLEM
005 C032413M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0065
DESCRIPTION:                 IS STUDENT MISBEHAVIOR A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032414                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032414A (01           ) 0000                     SERIOUS
002 C032414B (02           ) 1000                     MODERATE
003 C032414C (03           ) 0100                     MINOR
004 C032414D (04           ) 0010                     NOT A PROBLEM
005 C032414M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0066
DESCRIPTION:                 IS STUDENT CHEATING A PROBLEM IN YOUR SCHOOL?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032415                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032415A (01           ) 0000                     SERIOUS
002 C032415B (02           ) 1000                     MODERATE
003 C032415C (03           ) 0100                     MINOR
004 C032415D (04           ) 0010                     NOT A PROBLEM
005 C032415M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0067
DESCRIPTION:                 IS TEACHER MORALE POS. OR NEG.?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032502                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032502A (01           ) 0000                     VERY POSITIVE
002 C032502B (02           ) 1000                     SOMEWHAT POSITIVE
003 C032502C (03           ) 0100                     SOMEWHAT NEGATIVE
004 C032502D (04           ) 0010                     VERY NEGATIVE
005 C032502M (M            ) 0001                     MISSING

CONDITIONING VARIABLE ID:    SCHL0068
DESCRIPTION:                 ARE STUDENT ATTITUDES TO ACADEMICS POS. OR NEG.?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C032503                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032503A (01           ) 0000                     VERY POSITIVE
002 C032503B (02           ) 1000                     SOMEWHAT POSITIVE
003 C032503C (03           ) 0100                     SOMEWHAT NEGATIVE
004 C032503D (04           ) 0010                     VERY NEGATIVE
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
005 C032503M (M         ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SCHL0069
DESCRIPTION:               IS PARENT SUPPORT FOR ACHIEVEMENT POS. OR NEG.?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032505                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032505A (01        ) 0000                       VERY POSITIVE
002 C032505B (02        ) 1000                       SOMEWHAT POSITIVE
003 C032505C (03        ) 0100                       SOMEWHAT NEGATIVE
004 C032505D (04        ) 0010                       VERY NEGATIVE
005 C032505M (M         ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SCHL0070
DESCRIPTION:               IS REGARD FOR SCHOOL PROPERTY POS. OR NEG.?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C032506                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       4

001 C032506A (01        ) 0000                       VERY POSITIVE
002 C032506B (02        ) 1000                       SOMEWHAT POSITIVE
003 C032506C (03        ) 0100                       SOMEWHAT NEGATIVE
004 C032506D (04        ) 0010                       VERY NEGATIVE
005 C032506M (M         ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SCHL0071
DESCRIPTION:               % ABSENT ON AVERAGE DAY?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C033601                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       4

001 C033601A (01        ) 0000                       0-2%
002 C033601B (02        ) 1000                       3-5%
003 C033601C (03        ) 0100                       6-10%
004 C033601D (04        ) 0010                       MORE THAN 10%
005 C033601M (M         ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SCHL0072
DESCRIPTION:               WHAT % OF TEACHERS ABSENT ON GIVEN DAY?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C036501                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       4

001 C036501A (01        ) 0000                       0-2%
002 C036501B (02        ) 1000                       3-5%
003 C036501C (03        ) 0100                       6-10%
004 C036501D (04        ) 0010                       MORE THAN 10%
005 C036501M (M         ) 0001                       MISSING

CONDITIONING VARIABLE ID:  SCHL0073
DESCRIPTION:               % OF STUDS EROLLED AT START OF YR EROLLED AT END?
GRADES/ASSESSMENTS:        N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   C037801                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   9
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       8

001 C037801A (01        ) 00000000                   98-100%
002 C037801B (02        ) 10000000                   95-97%
003 C037801C (03        ) 01000000                   90-94%
004 C037801D (04        ) 00100000                   80-89%
005 C037801E (05        ) 00010000                   70-79%
006 C037801F (06        ) 00001000                   60-69%
007 C037801G (07        ) 00000100                   50-59%
008 C037801H (08        ) 00000010                   LESS THAN 50%
009 C037801M (M         ) 00000001                   MISSING

CONDITIONING VARIABLE ID:  SCHL0074
DESCRIPTION:               % OF 4TH GRADERS HELD BACK & REPEATING 4TH GRADE?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   C037901                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:       5

001 C037901A (01        ) 00000                      0%
002 C037901B (02        ) 10000                      1-2%
003 C037901C (03        ) 01000                      3-5%
004 C037901D (04        ) 00100                      6-10%
005 C037901E (05        ) 00010                      MORE THAN 10%
006 C037901M (M         ) 00001                      MISSING

CONDITIONING VARIABLE ID:  SCHL0075
DESCRIPTION:               % OF FULL TIME TEACHERS LEFT BEFORE END OF YR?
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C038001
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
                                                       NUMBER OF INDEPENDENT CONTRASTS:        7

001 C038001A (01           ) 0000000                   0%
002 C038001B (02           ) 1000000                   1-2%
003 C038001C (03           ) 0100000                   3-5%
004 C038001D (04           ) 0010000                   6-10%
005 C038001E (05           ) 0001000                   11-15%
006 C038001F (06           ) 0000100                   16-20%
007 C038001G (07           ) 0000010                   MORE THAN 20%
008 C038001M (M            ) 0000001                   MISSING

CONDITIONING VARIABLE ID:    SCHL0076
DESCRIPTION:                 IS SCHOOL IN NATIONAL SCHOOL LUNCH PROGRAM?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C038301
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038301Y (01           ) 00                        YES
002 C038301N (02           ) 10                        NO
003 C038301M (M            ) 01                        MISSING

CONDITIONING VARIABLE ID:    SCHL0077
DESCRIPTION:                 SCHOOL RECEIVE CHAP 1/TITLE 1 FUNDING?
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C038801
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
                                                       NUMBER OF INDEPENDENT CONTRASTS:        2

001 C038801Y (01           ) 00                        YES
002 C038801N (02           ) 10                        NO
003 C038801M (M            ) 01                        MISSING

CONDITIONING VARIABLE ID:    SCHL0078
DESCRIPTION:                 DID PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034101
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034101Y (01           ) 0                         YES
002 C034101M (M            ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0079
DESCRIPTION:                 DID HEADMASTER/HEADMISTRESS FILL OUT QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034102
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034102Y (01           ) 0                         YES
002 C034102M (M            ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0080
DESCRIPTION:                 DID HEAD TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034103
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034103Y (01           ) 0                         YES
002 C034103M (M            ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0081
DESCRIPTION:                 DID VICE PRINCIPAL FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034104
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034104Y (01           ) 0                         YES
002 C034104M (M            ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0082
DESCRIPTION:                 DID COUNSELOR FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034105
TYPE OF CONTRAST:            CLASS                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C034105Y (01           ) 0                         YES
002 C034105M (M            ) 1                         MISSING

CONDITIONING VARIABLE ID:    SCHL0083
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 DID CURRICULUM COORD FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034106                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 C034106Y (01          ) 0                       YES
002 C034106M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0084
DESCRIPTION:                 DID TEACHER FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034107                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 C034107Y (01          ) 0                       YES
002 C034107M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0085
DESCRIPTION:                 DID SECRETARY FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034108                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 C034108Y (01          ) 0                       YES
002 C034108M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:    SCHL0086
DESCRIPTION:                 DID OTHER PERSON FILL OUT THIS QUESTIONNAIRE
GRADES/ASSESSMENTS:          N04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C034109                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 C034109Y (01          ) 0                       YES
002 C034109M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:    TCHR0001
DESCRIPTION:                 WHAT IS YOUR GENDER?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T055901                TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       2

001 T055901A (01          ) 00                      MALE
002 T055901B (02          ) 10                      FEMALE
003 T055901M (M           ) 01                      MISSING

CONDITIONING VARIABLE ID:    TCHR0002
DESCRIPTION:                 WHICH BEST DESRIBES YOU?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056001                TOTAL NUMBER OF SPECIFIED CONTRASTS:   7
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       6

001 T056001A (01          ) 000000                  WHITE
002 T056001B (02          ) 100000                  BLACK
003 T056001C (03          ) 010000                  HISPANIC
004 T056001D (04          ) 001000                  ASIAN/PACIFIC AMERIC
005 T056001E (05          ) 000100                  AMER IND/ALASKA NATV
006 T056001F (06          ) 000010                  OTHER
007 T056001M (M           ) 000001                  MISSING

CONDITIONING VARIABLE ID:    TCHR0003
DESCRIPTION:                 YEARS TAUGHT
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040301                TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       5

001 T040301A (01          ) 00000                   2 YEARS OR LESS
002 T040301B (02          ) 10000                   3-5 YEARS
003 T040301C (03          ) 01000                   6-10 YEARS
004 T040301D (04          ) 00100                   11-24 YEARS
005 T040301E (05          ) 00010                   25 YEARS OR MORE
006 T040301M (M           ) 00001                   MISSING

CONDITIONING VARIABLE ID:    TCHR0004
DESCRIPTION:                 HOW MANY YRS TOTAL YOU TAUGHT MATH?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     T056101                TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       5

001 T056101A (01          ) 00000                   2 YEARS OR LESS
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
002 T056101B (02          ) 10000                3-5 YEARS
003 T056101C (03          ) 01000                6-10 YEARS
004 T056101D (04          ) 00100                11-24 YEARS
005 T056101E (05          ) 00010                25 YEARS OR MORE
006 T056101M (M           ) 00001                MISSING

CONDITIONING VARIABLE ID:   TCHR0005
DESCRIPTION:                HOW MANY YRS TOTAL YOU TAUGHT SCIENCE?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    T056102              TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        5

001 T056102A (01          ) 00000                2 YEARS OR LESS
002 T056102B (02          ) 10000                3-5 YEARS
003 T056102C (03          ) 01000                6-10 YEARS
004 T056102D (04          ) 00100                11-24 YEARS
005 T056102E (05          ) 00010                25 YEARS OR MORE
006 T056102M (M           ) 00001                MISSING

CONDITIONING VARIABLE ID:   TCHR0006
DESCRIPTION:                TYPE TCHNG CERT IN THIS ST IN MAIN FIELD?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056201              TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        6

001 T056201A (01          ) 000000               ADVANCED PROFESSIONL
002 T056201B (02          ) 100000               REGULAR/STANDARD ST
003 T056201C (03          ) 010000               PROBATIONARY STATE
004 T056201D (04          ) 001000               TEMPORARY/PROVISIONL
005 T056201E (05          ) 000100               OTHER THAN STATE CRT
006 T056201F (06          ) 000010               NOT HAVE CERT MAIN
007 T056201M (M           ) 000001               MISSING

CONDITIONING VARIABLE ID:   TCHR0007
DESCRIPTION:                CERTIFICATION, ELEMENTARY OR MIDDLE/JUNIOR HS ED?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040501              TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040501Y (01          ) 000                  YES
002 T040501N (02          ) 100                  NO
003 T040501C (03          ) 010                  NOT OFFERED IN STATE
004 T040501M (M           ) 001                  MISSING

CONDITIONING VARIABLE ID:   TCHR0008
DESCRIPTION:                DO YOU HAVE CERTIFICATION IN ELEMENTARY MATH?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    T040506              TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040506Y (01          ) 000                  YES
002 T040506N (02          ) 100                  NO
003 T040506C (03          ) 010                  NOT OFFERED IN STATE
004 T040506M (M           ) 001                  MISSING

CONDITIONING VARIABLE ID:   TCHR0009
DESCRIPTION:                DO YOU HAVE CERTIFICATION IN JR HIGH/SEC MATH?
GRADES/ASSESSMENTS:         N04
CONDITIONING VAR LABEL:
NAEP ID:                    T040504              TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040504Y (01          ) 000                  YES
002 T040504N (02          ) 100                  NO
003 T040504C (03          ) 010                  NOT OFFERED IN STATE
004 T040504M (M           ) 001                  MISSING

CONDITIONING VARIABLE ID:   TCHR0010
DESCRIPTION:                CERTIFICATION, ELEMENTARY SCIENCE?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040507              TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS                NUMBER OF INDEPENDENT CONTRASTS:        3

001 T040507Y (01          ) 000                  YES
002 T040507N (02          ) 100                  NO
003 T040507C (03          ) 010                  NOT OFFERED IN STATE
004 T040507M (M           ) 001                  MISSING

CONDITIONING VARIABLE ID:   TCHR0011
DESCRIPTION:                CERTIFICATION, MIDDLE/JUNIOR SCIENCE
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
NAEP ID:                     T040508               TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040508Y (01           ) 000                   YES
002 T040508N (02           ) 100                   NO
003 T040508C (03           ) 010                   NOT OFFERED IN STATE
004 T040508M (M            ) 001                   MISSING

CONDITIONING VARIABLE ID:    TCHR0012
DESCRIPTION:                 CERTIFICATION, OTHER
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040505               TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       3

001 T040505Y (01           ) 000                   YES
002 T040505N (02           ) 100                   NO
003 T040505C (03           ) 010                   NOT OFFERED IN STATE
004 T040505M (M            ) 001                   MISSING

CONDITIONING VARIABLE ID:    TCHR0013
DESCRIPTION:                 HIGHEST ACADEMIC DEGREE YOU HOLD?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056301               TOTAL NUMBER OF SPECIFIED CONTRASTS:   8
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       7

001 T056301A (01           ) 0000000               HIGH SCHOOL DIPLOMA
002 T056301B (02           ) 1000000               ASSOCIATES/VOCATIONL
003 T056301C (03           ) 0100000               BACHELORS DEGREE
004 T056301D (04           ) 0010000               MASTER'S DEGREE
005 T056301E (05           ) 0001000               EDUCATION SPECIALIST
006 T056301F (06           ) 0000100               DOCTORATE
007 T056301G (07           ) 0000010               PROFESSIONAL DEGREE
008 T056301M (M            ) 0000001               MISSING

CONDITIONING VARIABLE ID:    TCHR0014
DESCRIPTION:                 EDUCATION UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040701               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040701Y (01           ) 0                     YES
002 T040701M (M            ) 1                     MISSING

CONDITIONING VARIABLE ID:    TCHR0015
DESCRIPTION:                 ELMENT ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040706               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040706Y (01           ) 0                     YES
002 T040706M (M            ) 1                     MISSING

CONDITIONING VARIABLE ID:    TCHR0016
DESCRIPTION:                 SEC ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T040707               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040707Y (01           ) 0                     YES
002 T040707M (M            ) 1                     MISSING

CONDITIONING VARIABLE ID:    TCHR0017
DESCRIPTION:                 WAS YOUR UNDERGRADUATE MAJOR MATH?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     T040703               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040703Y (01           ) 0                     YES
002 T040703M (M            ) 1                     MISSING

CONDITIONING VARIABLE ID:    TCHR0018
DESCRIPTION:                 WAS YOUR UNDERGRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     T040704               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T040704Y (01           ) 0                     YES
002 T040704M (M            ) 1                     MISSING
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VARIABLE ID:  TCHR0019
DESCRIPTION:               SCIENCE ED UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040710
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040710Y (01          ) 0
002 T040710M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0020
DESCRIPTION:               LIFE SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040711
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040711Y (01          ) 0
002 T040711M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0021
DESCRIPTION:               PHYSICAL SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040712
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040712Y (01          ) 0
002 T040712M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0022
DESCRIPTION:               EARTH SCIENCE UNDERGRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040713
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040713Y (01          ) 0
002 T040713M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0023
DESCRIPTION:               SPECIAL EDUCATION UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040708
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040708Y (01          ) 0
002 T040708M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0024
DESCRIPTION:               BILINGUAL ED/ESL  UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040709
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040709Y (01          ) 0
002 T040709M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0025
DESCRIPTION:               OTHER UNDERGRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040705
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040705Y (01          ) 0
002 T040705M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0026
DESCRIPTION:               EDUCATION GRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040801
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040801Y (01          ) 0
002 T040801M (M           ) 1                      YES
                                                   MISSING

CONDITIONING VARIABLE ID:  TCHR0027
DESCRIPTION:               ELEMENTARY ED GRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040807
TYPE OF CONTRAST:          CLASS                   TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                   NUMBER OF INDEPENDENT CONTRASTS:       1
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 T040807Y (01          ) 0                             YES
002 T040807M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0028
DESCRIPTION:               SECONDARY ED GRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040808                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040808Y (01          ) 0                             YES
002 T040808M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0029
DESCRIPTION:               WAS YOUR GRADUATE MAJOR MATHEMATICS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T040803                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040803Y (01          ) 0                             YES
002 T040803M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0030
DESCRIPTION:               WAS YOUR GRADUATE MAJOR MATH ED?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T040804                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040804Y (01          ) 0                             YES
002 T040804M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0031
DESCRIPTION:               SCIENCE ED GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040814                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040814Y (01          ) 0                             YES
002 T040814M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0032
DESCRIPTION:               LIFE SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040815                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040815Y (01          ) 0                             YES
002 T040815M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0033
DESCRIPTION:               PHYSICAL SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040816                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040816Y (01          ) 0                             YES
002 T040816M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0034
DESCRIPTION:               EARTH SCIENCE GRAD MAJOR?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040817                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040817Y (01          ) 0                             YES
002 T040817M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0035
DESCRIPTION:               SPECIAL ED GRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T040809                        TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 T040809Y (01          ) 0                             YES
002 T040809M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:  TCHR0036
DESCRIPTION:               BILINGUAL GRAD MAJOR
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
NAEP ID:                    T040810
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040810Y (01          ) 0                     YES
002 T040810M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0037
DESCRIPTION:                ADMIN/SUPERVISION GRAD MAJOR
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040811
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040811Y (01          ) 0                     YES
002 T040811M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0038
DESCRIPTION:                CURRICULUM/INSTRUCTION GRAD MAJOR?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040812
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040812Y (01          ) 0                     YES
002 T040812M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0039
DESCRIPTION:                COUNSELING GRAD MAJOR?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040813
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040813Y (01          ) 0                     YES
002 T040813M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0040
DESCRIPTION:                OTHER GRAD MAJOR
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040805
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040805Y (01          ) 0                     YES
002 T040805M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0041
DESCRIPTION:                NO GRADUATE STUDY
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T040806
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T040806Y (01          ) 0                     YES
002 T040806M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0042
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-EDUCATION
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056401
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056401Y (01          ) 0                     YES
002 T056401M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0043
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-ELEMENTARY ED
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056402
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056402Y (01          ) 0                     YES
002 T056402M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0044
DESCRIPTION:                UNDERGRAD/GRAD MINOR STUDY-SECONDARY ED
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T056403
TYPE OF CONTRAST:           CLASS                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056403Y (01          ) 0                     YES
002 T056403M (M           ) 1                     MISSING

CONDITIONING VARIABLE ID:   TCHR0045
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     T056404                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056404Y (01         ) 0                        YES
002 T056404M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0046
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-MATHEMATICS ED
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056405                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056405Y (01         ) 0                        YES
002 T056405M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0047
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-SCIENCE ED
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056413                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056413Y (01         ) 0                        YES
002 T056413M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0048
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-LIFE SCIENCE
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056414                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056414Y (01         ) 0                        YES
002 T056414M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0049
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-PHYSICAL SCIENCE
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056415                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056415Y (01         ) 0                        YES
002 T056415M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0050
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-EARTH SCIENCE
GRADES/ASSESSMENTS:          N04
CONDITIONING VAR LABEL:
NAEP ID:                     T056416                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056416Y (01         ) 0                        YES
002 T056416M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0051
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-SPECIAL ED
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056406                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056406Y (01         ) 0                        YES
002 T056406M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0052
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-BILINGUAL ED
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056407                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056407Y (01         ) 0                        YES
002 T056407M (M          ) 1                        MISSING

CONDITIONING VARIABLE ID:    TCHR0053
DESCRIPTION:                 UNDERGRAD/GRAD MINOR STUDY-ADMIN & SUPERVISION
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T056408                TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056408Y (01         ) 0                        YES
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
002 T056408M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0054
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-CURRICULUM & INSTRUC
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056409
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                      NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056409Y (01         ) 0
002 T056409M (M          ) 1                          YES
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0055
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-COUNSELING
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056410
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                      NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056410Y (01         ) 0
002 T056410M (M          ) 1                          YES
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0056
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-OTHER
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056411
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                      NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056411Y (01         ) 0
002 T056411M (M          ) 1                          YES
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0057
DESCRIPTION:               UNDERGRAD/GRAD MINOR STUDY-NONE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056412
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                      NUMBER OF INDEPENDENT CONTRASTS:       1
001 T056412Y (01         ) 0
002 T056412M (M          ) 1                          YES
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0058
DESCRIPTION:               LAST YR, HOW MUCH TIME IN MATH/MATH ED SEM/WRKSHP?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T056501
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
                                                      NUMBER OF INDEPENDENT CONTRASTS:       5
001 T056501A (01         ) 00000
002 T056501B (02         ) 10000                      NONE
003 T056501C (03         ) 01000                      LESS THAN 6 HOURS
004 T056501D (04         ) 00100                      6-15 HOURS
005 T056501E (05         ) 00010                      16-35 HOURS
006 T056501M (M          ) 00001                      MORE THAN 35 HOURS
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0059
DESCRIPTION:               LAST YR, HOW MUCH TIME IN SCI/SCI ED SEM/WRKSHPS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T058101
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
                                                      NUMBER OF INDEPENDENT CONTRASTS:       5
001 T058101A (01         ) 00000
002 T058101B (02         ) 10000                      NONE
003 T058101C (03         ) 01000                      LESS THAN 6 HOURS
004 T058101D (04         ) 00100                      6-15 HOURS
005 T058101E (05         ) 00010                      16-35 HOURS
006 T058101M (M          ) 00001                      MORE THAN 35 HOURS
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0060
DESCRIPTION:               LAST 2 YRS, HOW MANY MATH/MATH ED UNIV COURSES?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T056601
TYPE OF CONTRAST:          CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
                                                      NUMBER OF INDEPENDENT CONTRASTS:       5
001 T056601A (01         ) 00000
002 T056601B (02         ) 10000                      NONE
003 T056601C (03         ) 01000                      ONE
004 T056601D (04         ) 00100                      TWO
005 T056601E (05         ) 00010                      THREE
006 T056601M (M          ) 00001                      FOUR OR MORE
                                                      MISSING

CONDITIONING VARIABLE ID:  TCHR0061
DESCRIPTION:               LAST 2 YRS, HOW MANY SCI/SCI ED UNIV COURSES?
GRADES/ASSESSMENTS:        N04
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VAR LABEL:
NAEP ID:                   T058201               TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       5

001 T058201A (01        ) 00000                  NONE
002 T058201B (02        ) 10000                  ONE
003 T058201C (03        ) 01000                  TWO
004 T058201D (04        ) 00100                  THREE
005 T058201E (05        ) 00010                  FOUR OR MORE
006 T058201M (M         ) 00001                  MISSING

CONDITIONING VARIABLE ID:  TCHR0062
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TELECOMM USE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056701               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056701Y (01        ) 0                      YES
002 T056701M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0063
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-TECH USE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056702               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056702Y (01        ) 0                      YES
002 T056702M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0064
DESCRIPTION:               PAST 5 YRS, TAKEN COURSES/IN PRO DEVP-COOP INSTRCT
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056703               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056703Y (01        ) 0                      YES
002 T056703M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0065
DESCRIPTION:               PAST 5 YRS, COURSES/IN PRO DEVLP-INTERDISP INSTRCT
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056704               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056704Y (01        ) 0                      YES
002 T056704M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0066
DESCRIPTION:               PAST 5 YRS, COURSES/IN PRO DEVLP-PORTFOLIO ASSMNT
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056705               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056705Y (01        ) 0                      YES
002 T056705M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0067
DESCRIPTION:               PAST 5 YRS, COURSES/IN PRO DEVLP-PERF BASED ASSMNT
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056706               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056706Y (01        ) 0                      YES
002 T056706M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0068
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH HIGHORDER THKG
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056707               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1

001 T056707Y (01        ) 0                      YES
002 T056707M (M         ) 1                      MISSING

CONDITIONING VARIABLE ID:  TCHR0069
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH DIFF CULT BKGD
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056708               TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:       1
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 T056708Y (01          ) 0                          YES
002 T056708M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0070
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH LEP STUDENTS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056709
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                       NUMBER OF INDEPENDENT CONTRASTS:          1

001 T056709Y (01          ) 0                          YES
002 T056709M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0071
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-TEACH SPEC NEED STDS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056710
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                       NUMBER OF INDEPENDENT CONTRASTS:          1

001 T056710Y (01          ) 0                          YES
002 T056710M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0072
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-CLASSRM MNGMT/ORG
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056711
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                       NUMBER OF INDEPENDENT CONTRASTS:          1

001 T056711Y (01          ) 0                          YES
002 T056711M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0073
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-OTHER PROF ISSUES
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056712
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                       NUMBER OF INDEPENDENT CONTRASTS:          1

001 T056712Y (01          ) 0                          YES
002 T056712M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0074
DESCRIPTION:               PAST 5 YRS, COURSES/PRO DEVLP-NONE OF ABOVE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T056713
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
                                                       NUMBER OF INDEPENDENT CONTRASTS:          1

001 T056713Y (01          ) 0                          YES
002 T056713M (M           ) 1                          MISSING

CONDITIONING VARIABLE ID:  TCHR0075
DESCRIPTION:               AVAILABILITY OF RESOURCES
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T041201
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      5
                                                       NUMBER OF INDEPENDENT CONTRASTS:          4

001 T041201A (01          ) 0000                       GET ALL RESOURCES
002 T041201B (02          ) 1000                       GET MOST RESOURCES
003 T041201C (03          ) 0100                       GET SOME RESOURCES
004 T041201D (04          ) 0010                       DONT GET RESOURCES
005 T041201M (M           ) 0001                       MISSING

CONDITIONING VARIABLE ID:  TCHR0076
DESCRIPTION:               ARE CURRICULUM SPECIALISTS AVAILABLE FOR MATH?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T041302
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
                                                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 T041302Y (01          ) 00                         YES
002 T041302N (02          ) 10                         NO
003 T041302M (M           ) 01                         MISSING

CONDITIONING VARIABLE ID:  TCHR0077
DESCRIPTION:               SCIENCE CURRICULUM SPECIALIST
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:
NAEP ID:                   T041303
TYPE OF CONTRAST:          CLASS                       TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
                                                       NUMBER OF INDEPENDENT CONTRASTS:          2

001 T041303Y (01          ) 00                         YES
002 T041303N (02          ) 10                         NO
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
003 T041303M (M         ) 01                  MISSING

CONDITIONING VARIABLE ID:  TCHR0078
DESCRIPTION:               HOW MANY SCHOOL HOURS ARE PREP TIME PER WEEK?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   7
NAEP ID:                   T056801            NUMBER OF INDEPENDENT CONTRASTS:       6
TYPE OF CONTRAST:          CLASS

001 T056801A (01        ) 000000              NONE
002 T056801B (02        ) 100000              LESS THAN ONE
003 T056801C (03        ) 010000              1-2
004 T056801D (04        ) 001000              3-4
005 T056801E (05        ) 000100              5
006 T056801F (06        ) 000010              MORE THAN 5
007 T056801M (M         ) 000001              MISSING

CONDITIONING VARIABLE ID:  TCHR0079
DESCRIPTION:               HOW MANY YRS TAUGHT SCI IN PUB/PRIV SCHOOLS?
GRADES/ASSESSMENTS:        N04
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   7
NAEP ID:                   T060201            NUMBER OF INDEPENDENT CONTRASTS:       6
TYPE OF CONTRAST:          CLASS

001 T060201A (01        ) 000000              NOT TAUGHT SCIENCE
002 T060201B (02        ) 100000              LESS THAN 3 YEARS
003 T060201C (03        ) 010000              3-5 YEARS
004 T060201D (04        ) 001000              6-9 YEARS
005 T060201E (05        ) 000100              10-20 YEARS
006 T060201F (06        ) 000010              MORE THAN 20 YEARS
007 T060201M (M         ) 000001              MISSING

CONDITIONING VARIABLE ID:  TCHR0080
DESCRIPTION:               METHODS OF TCHING SCI? COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060301            NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T060301Y (01        ) 0                   YES
002 T060301M (M         ) 1                   MISSING

CONDITIONING VARIABLE ID:  TCHR0081
DESCRIPTION:               METHODS OF TCHING SCI?WRKSHP >1 WK
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060311            NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T060311Y (01        ) 0                   YES
002 T060311M (M         ) 1                   MISSING

CONDITIONING VARIABLE ID:  TCHR0082
DESCRIPTION:               METHODS OF TCHING SCI?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060321            NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T060321Y (01        ) 0                   YES
002 T060321M (M         ) 1                   MISSING

CONDITIONING VARIABLE ID:  TCHR0083
DESCRIPTION:               METHODS OF TCHING SCI?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060331            NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T060331Y (01        ) 0                   YES
002 T060331M (M         ) 1                   MISSING

CONDITIONING VARIABLE ID:  TCHR0084
DESCRIPTION:               METHODS OF TCHING SCI?OTHER PROF. DEV
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060341            NUMBER OF INDEPENDENT CONTRASTS:       1
TYPE OF CONTRAST:          CLASS

001 T060341Y (01        ) 0                   YES
002 T060341M (M         ) 1                   MISSING

CONDITIONING VARIABLE ID:  TCHR0085
DESCRIPTION:               UNIV COURSES IN-BIO/LIFE SCI? COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:                       TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
NAEP ID:                   T060302
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:            CLASS                  NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060302Y (01          ) 0                       YES
002 T060302M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0086
DESCRIPTION:               UNIV COURSES IN-BIO/LIFE SCI?WRKSHP >1 WK
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060312                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060312Y (01          ) 0                       YES
002 T060312M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0087
DESCRIPTION:               UNIV COURSES IN-BIO/LIFE SCI?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060322                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060322Y (01          ) 0                       YES
002 T060322M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0088
DESCRIPTION:               UNIV COURSES IN-BIO/LIFE SCI?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060332                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060332Y (01          ) 0                       YES
002 T060332M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0089
DESCRIPTION:               UNIV COURSES IN-BIO/LIFE SCI?OTHER PROF. DEV
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060342                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060342Y (01          ) 0                       YES
002 T060342M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0090
DESCRIPTION:               UNIV COURSES IN-CHEMISTRY? COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060303                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060303Y (01          ) 0                       YES
002 T060303M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0091
DESCRIPTION:               UNIV COURSES IN-CHEMISTRY?WRKSHP >1 WK
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060313                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060313Y (01          ) 0                       YES
002 T060313M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0092
DESCRIPTION:               UNIV COURSES IN-CHEMISTRY?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060323                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060323Y (01          ) 0                       YES
002 T060323M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0093
DESCRIPTION:               UNIV COURSES IN-CHEMISTRY?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060333                  TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          1

001 T060333Y (01          ) 0                       YES
002 T060333M (M           ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0094
DESCRIPTION:               UNIV COURSES IN-CHEMISTRY?OTHER PROF. DEV
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060343                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060343Y (01          ) 0                             YES
002 T060343M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0095
DESCRIPTION:                 UNIV COURSES IN-PHYSICS? COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060304                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060304Y (01          ) 0                             YES
002 T060304M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0096
DESCRIPTION:                 UNIV COURSES IN-PHYSICS?WRKSHP >1 WK
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060314                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060314Y (01          ) 0                             YES
002 T060314M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0097
DESCRIPTION:                 UNIV COURSES IN-PHYSICS?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060324                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060324Y (01          ) 0                             YES
002 T060324M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0098
DESCRIPTION:                 UNIV COURSES IN-PHYSICS?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060334                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060334Y (01          ) 0                             YES
002 T060334M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0099
DESCRIPTION:                 UNIV COURSES IN-PHYSICS?OTHER PROF. DEV
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060344                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060344Y (01          ) 0                             YES
002 T060344M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0100
DESCRIPTION:                 UNIV COURSES IN-EARTH SCI? COLLEGE COURSE
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060305                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060305Y (01          ) 0                             YES
002 T060305M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0101
DESCRIPTION:                 UNIV COURSES IN-EARTH SCI?WRKSHP >1 WK
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060315                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060315Y (01          ) 0                             YES
002 T060315M (M           ) 1                             MISSING

CONDITIONING VARIABLE ID:    TCHR0102
DESCRIPTION:                 UNIV COURSES IN-EARTH SCI?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060325                      TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                        NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060325Y (01          ) 0                             YES
002 T060325M (M           ) 1                             MISSING
```

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Table C-5 (continued)
Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VARIABLE ID:  TCHR0103
DESCRIPTION:               UNIV COURSES IN-EARTH SCI?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060335                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060335Y (01         ) 0                       YES
002 T060335M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0104
DESCRIPTION:               UNIV COURSES IN-EARTH SCI?OTHER PROF. DEV
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060345                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060345Y (01         ) 0                       YES
002 T060345M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0105
DESCRIPTION:               UNIV COURSES-OTHER TYPES OF SCI? COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060306                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060306Y (01         ) 0                       YES
002 T060306M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0106
DESCRIPTION:               UNIV COURSES-OTHER TYPES OF SCI?WRKSHP >1 WK
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060316                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060316Y (01         ) 0                       YES
002 T060316M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0107
DESCRIPTION:               UNIV COURSES-OTHR TYPES OF SCI?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060326                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060326Y (01         ) 0                       YES
002 T060326M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0108
DESCRIPTION:               UNIV COURSES-OTHER TYPES OF SCI?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060336                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060336Y (01         ) 0                       YES
002 T060336M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0109
DESCRIPTION:               UNIV COURSES-OTHER TYPES OF SCI?OTHER PROF. DEV
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060346                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060346Y (01         ) 0                       YES
002 T060346M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0110
DESCRIPTION:               UNIV COURSES IN-NONE OF ABOVE? COLLEGE COURSE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060307                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1

001 T060307Y (01         ) 0                       YES
002 T060307M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  TCHR0111
DESCRIPTION:               UNIV COURSES IN-NONE OF ABOVE?WRKSHP >1 WK
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060317                 TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:       1
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 T060317Y (01          ) 0                        YES
002 T060317M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0112
DESCRIPTION:               UNIV COURSES IN-NONE OF ABOVE?WRKSHP <1 WK >1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060327                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060327Y (01          ) 0                        YES
002 T060327M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0113
DESCRIPTION:               UNIV COURSES IN-NONE OF ABOVE?WRKSHP <= 1 DAY
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060337                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060337Y (01          ) 0                        YES
002 T060337M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0114
DESCRIPTION:               UNIV COURSES IN-NONE OF ABOVE?OTHER PROF. DEV
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060347                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060347Y (01          ) 0                        YES
002 T060347M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0115
DESCRIPTION:               PAST 5 YRS, COURSES/ACTVTS IN-COMP USE TO GET DATA
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060401                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060401Y (01          ) 0                        YES
002 T060401M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0116
DESCRIPTION:               PAST 5 YRS, COURSES/ACTVTS IN-COMP DATA ANALYSIS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060402                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060402Y (01          ) 0                        YES
002 T060402M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0117
DESCRIPTION:               PAST 5 YRS, COURSES/ACTVTS IN-MULTIMEDIA SCI ED?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060403                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060403Y (01          ) 0                        YES
002 T060403M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0118
DESCRIPTION:               PAST 5 YRS, COURSES/ACTVTS IN-LAB MNGMT/SAFETY?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060404                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060404Y (01          ) 0                        YES
002 T060404M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0119
DESCRIPTION:               PAST 5 YRS, COURSES/ACTVTS IN-INTEGRATED SCI INST?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060405                   TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                     NUMBER OF INDEPENDENT CONTRASTS:        1

001 T060405Y (01          ) 0                        YES
002 T060405M (M           ) 1                        MISSING

CONDITIONING VARIABLE ID:  TCHR0120
DESCRIPTION:               YOU BELONG TO 1 OR > SCI RELATED SCI ORGS?
GRADES/ASSESSMENTS:        N04, N08, S08
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VAR LABEL:
NAEP ID:                     T060501
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     3
                                                        NUMBER OF INDEPENDENT CONTRASTS:         2
001 T060501Y (01          ) 00                          YES
002 T060501N (02          ) 10                          NO
003 T060501M (M           ) 01                          MISSING

CONDITIONING VARIABLE ID:    TSUB0001
DESCRIPTION:                 HOW OFTEN STUDS READ SCI TEXTBOOK?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060601
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060601A (01          ) 0000                        ALMOST EVERY DAY
002 T060601B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060601C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060601D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060601M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0002
DESCRIPTION:                 HOW OFTEN STUDS READ BOOK/MAN ABOUT SCI?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060602
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060602A (01          ) 0000                        ALMOST EVERY DAY
002 T060602B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060602C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060602D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060602M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0003
DESCRIPTION:                 HOW OFTEN STUDS DISCUSS SCI IN THE NEWS?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060603
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060603A (01          ) 0000                        ALMOST EVERY DAY
002 T060603B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060603C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060603D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060603M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0004
DESCRIPTION:                 HOW OFTEN STUDS WORK W/ OTHER STUDS ON ACT/PROJCT?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060604
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060604A (01          ) 0000                        ALMOST EVERY DAY
002 T060604B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060604C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060604D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060604M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0005
DESCRIPTION:                 HOW OFTEN STUDS GIVE ORAL SCI REPORT?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060605
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060605A (01          ) 0000                        ALMOST EVERY DAY
002 T060605B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060605C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060605D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060605M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0006
DESCRIPTION:                 HOW OFTEN STUDS PREPARE A WRITTEN SCI REPORT?
GRADES/ASSESSMENTS:          N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     T060606
TYPE OF CONTRAST:            CLASS                      TOTAL NUMBER OF SPECIFIED CONTRASTS:     5
                                                        NUMBER OF INDEPENDENT CONTRASTS:         4
001 T060606A (01          ) 0000                        ALMOST EVERY DAY
002 T060606B (02          ) 1000                        ONCE OR TWICE A WEEK
003 T060606C (03          ) 0100                        ONCE OR TWICE/MONTH
004 T060606D (04          ) 0010                        NEVER OR HARDLY EVER
005 T060606M (M           ) 0001                        MISSING

CONDITIONING VARIABLE ID:    TSUB0007
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                     HOW OFTEN STUDS DO HANDS ON SCI ACTIVITIES IN SCI?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060607                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060607A (01            ) 0000                        ALMOST EVERY DAY
002 T060607B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060607C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060607D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060607M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0008
DESCRIPTION:                     HOW OFTEN STUDS TALK ABOUT MEASURES/RESULTS?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060608                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060608A (01            ) 0000                        ALMOST EVERY DAY
002 T060608B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060608C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060608D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060608M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0009
DESCRIPTION:                     HOW OFTEN STUDS TAKE SCI TEST OR QUIZ?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060609                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060609A (01            ) 0000                        ALMOST EVERY DAY
002 T060609B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060609C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060609D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060609M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0010
DESCRIPTION:                     HOW OFTEN STUDS USE LIBRARY RESOURCES FOR SCI?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060610                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060610A (01            ) 0000                        ALMOST EVERY DAY
002 T060610B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060610C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060610D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060610M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0011
DESCRIPTION:                     HOW OFTEN STUDS USE COMPUTERS FOR SCI?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060611                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060611A (01            ) 0000                        ALMOST EVERY DAY
002 T060611B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060611C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060611D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060611M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0012
DESCRIPTION:                     HOW OFTEN DO YOU TALK TO CLASS ABOUT SCI?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060701                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060701A (01            ) 0000                        ALMOST EVERY DAY
002 T060701B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060701C (03            ) 0100                        ONCE OR TWICE/MONTH
004 T060701D (04            ) 0010                        NEVER OR HARDLY EVER
005 T060701M (M             ) 0001                        MISSING

CONDITIONING VARIABLE ID:        TSUB0013
DESCRIPTION:                     HOW OFTEN DO YOU DO A SCI DEMONSTRATION?
GRADES/ASSESSMENTS:              N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                         T060702                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:                CLASS                    NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060702A (01            ) 0000                        ALMOST EVERY DAY
002 T060702B (02            ) 1000                        ONCE OR TWICE A WEEK
003 T060702C (03            ) 0100                        ONCE OR TWICE/MONTH
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
004 T060702D (04        ) 0010                   NEVER OR HARDLY EVER
005 T060702M (M         ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0014
DESCRIPTION:               HOW OFTEN DO YOU SHOW A SCI VIDEOTAPE/TV PROGRAM?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060703               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060703A (01        ) 0000                   ALMOST EVERY DAY
002 T060703B (02        ) 1000                   ONCE OR TWICE A WEEK
003 T060703C (03        ) 0100                   ONCE OR TWICE/MONTH
004 T060703D (04        ) 0010                   NEVER OR HARDLY EVER
005 T060703M (M         ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0015
DESCRIPTION:               HOW OFTEN DO YOU USE COMPUTERS FOR SCI?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060704               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060704A (01        ) 0000                   ALMOST EVERY DAY
002 T060704B (02        ) 1000                   ONCE OR TWICE A WEEK
003 T060704C (03        ) 0100                   ONCE OR TWICE/MONTH
004 T060704D (04        ) 0010                   NEVER OR HARDLY EVER
005 T060704M (M         ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0016
DESCRIPTION:               HOW OFTEN DO YOU USE CDS OR LASER DISKS ON SCI?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060705               TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        4

001 T060705A (01        ) 0000                   ALMOST EVERY DAY
002 T060705B (02        ) 1000                   ONCE OR TWICE A WEEK
003 T060705C (03        ) 0100                   ONCE OR TWICE/MONTH
004 T060705D (04        ) 0010                   NEVER OR HARDLY EVER
005 T060705M (M         ) 0001                   MISSING

CONDITIONING VARIABLE ID:  TSUB0017
DESCRIPTION:               HOW OFTEN YOUR SCI STUDS GO ON SCI FIELD TRIPS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060801               TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        3

001 T060801A (01        ) 000                    3 OR MORE TIMES/YEAR
002 T060801B (02        ) 100                    1 OR 2 TIMES A YEAR
003 T060801C (03        ) 010                    NEVER OR HARDLY EVER
004 T060801M (M         ) 001                    MISSING

CONDITIONING VARIABLE ID:  TSUB0018
DESCRIPTION:               HOW OFTEN DO YOU BRING GUEST SPEAKER FOR SCI STUDS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T060901               TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        3

001 T060901A (01        ) 000                    3 OR MORE TIMES/YEAR
002 T060901B (02        ) 100                    1 OR 2 TIMES A YEAR
003 T060901C (03        ) 010                    NEVER OR HARDLY EVER
004 T060901M (M         ) 001                    MISSING

CONDITIONING VARIABLE ID:  TSUB0019
DESCRIPTION:               SAVE STUDS SCI WORK IN PORTFOLIOS FOR ASSESSMENT?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061001               TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        2

001 T061001Y (01        ) 00                     YES
002 T061001N (02        ) 10                     NO
003 T061001M (M         ) 01                     MISSING

CONDITIONING VARIABLE ID:  TSUB0020
DESCRIPTION:               HOW MUCH EMPHASIS-KNOWING SCI FACTS/TERMS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061101               TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:          CLASS                 NUMBER OF INDEPENDENT CONTRASTS:        3

001 T061101A (01        ) 000                    HEAVY EMPHASIS
002 T061101B (02        ) 100                    MODERATE EMPHASIS
003 T061101C (03        ) 010                    LITTLE/NO EMPHASIS
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
004 T061101M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0021
DESCRIPTION:               HOW MUCH EMPHASIS-UNDERSTANDING KEY SCI CONCEPTS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061102                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061102A (01         ) 000                        HEAVY EMPHASIS
002 T061102B (02         ) 100                        MODERATE EMPHASIS
003 T061102C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061102M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0022
DESCRIPTION:               HOW MUCH EMPHASIS-DEVELOP SCI PROB SOLVING SKILL?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061103                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061103A (01         ) 000                        HEAVY EMPHASIS
002 T061103B (02         ) 100                        MODERATE EMPHASIS
003 T061103C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061103M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0023
DESCRIPTION:               HOW MUCH EMPHASIS-SCI RELEVANCE TO SOCIETY/TECH?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061104                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061104A (01         ) 000                        HEAVY EMPHASIS
002 T061104B (02         ) 100                        MODERATE EMPHASIS
003 T061104C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061104M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0024
DESCRIPTION:               HOW MUCH EMPHASIS-COMMUNICATE IDEAS IN SCI?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061105                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061105A (01         ) 000                        HEAVY EMPHASIS
002 T061105B (02         ) 100                        MODERATE EMPHASIS
003 T061105C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061105M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0025
DESCRIPTION:               HOW MUCH EMPHASIS-DEVELOPING LAB SKILLS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061106                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061106A (01         ) 000                        HEAVY EMPHASIS
002 T061106B (02         ) 100                        MODERATE EMPHASIS
003 T061106C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061106M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0026
DESCRIPTION:               HOW MUCH EMPHASIS-DEVELOPING STUDS SCI INTEREST?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061107                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061107A (01         ) 000                        HEAVY EMPHASIS
002 T061107B (02         ) 100                        MODERATE EMPHASIS
003 T061107C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061107M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0027
DESCRIPTION:               HOW MUCH EMPHASIS-DEVELOPING DATA ANALYSIS SKILLS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061108                    TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061108A (01         ) 000                        HEAVY EMPHASIS
002 T061108B (02         ) 100                        MODERATE EMPHASIS
003 T061108C (03         ) 010                        LITTLE/NO EMPHASIS
004 T061108M (M          ) 001                        MISSING

CONDITIONING VARIABLE ID:  TSUB0028
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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DESCRIPTION:                  HOW MUCH EMPHASIS-USING TECH AS SCI TOOL?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061109                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        3

001 T061109A (01            ) 000                     HEAVY EMPHASIS
002 T061109B (02            ) 100                     MODERATE EMPHASIS
003 T061109C (03            ) 010                     LITTLE/NO EMPHASIS
004 T061109M (M             ) 001                     MISSING

CONDITIONING VARIABLE ID:     TSUB0029
DESCRIPTION:                  EVER ASSIGN SOLO/GROUP SCI PROJECTS THAT TAKE >WK?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061201                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        2

001 T061201Y (01            ) 00                      YES
002 T061201N (02            ) 10                      NO
003 T061201M (M             ) 01                      MISSING

CONDITIONING VARIABLE ID:     TSUB0030
DESCRIPTION:                  HOW OFTEN USE MULT CHOICE TESTS TO ACCESS?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061301                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061301A (01            ) 00000                   ONCE OR TWICE WEEK
002 T061301B (02            ) 10000                   ONCE OR TWICE MONTH
003 T061301C (03            ) 01000                   ONCE/GRADING PERIOD
004 T061301D (04            ) 00100                   ONCE OR TWICE/YEAR
005 T061301E (05            ) 00010                   NEVER OR HARDLY EVER
006 T061301M (M             ) 00001                   MISSING

CONDITIONING VARIABLE ID:     TSUB0031
DESCRIPTION:                  HOW OFTEN USE SHOR/LONG WRITTEN RESPONSE TO ACCESS
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061302                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061302A (01            ) 00000                   ONCE OR TWICE WEEK
002 T061302B (02            ) 10000                   ONCE OR TWICE MONTH
003 T061302C (03            ) 01000                   ONCE/GRADING PERIOD
004 T061302D (04            ) 00100                   ONCE OR TWICE/YEAR
005 T061302E (05            ) 00010                   NEVER OR HARDLY EVER
006 T061302M (M             ) 00001                   MISSING

CONDITIONING VARIABLE ID:     TSUB0032
DESCRIPTION:                  HOW OFTEN USE SOLO PROJECTS TO ACCESS?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061303                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061303A (01            ) 00000                   ONCE OR TWICE WEEK
002 T061303B (02            ) 10000                   ONCE OR TWICE MONTH
003 T061303C (03            ) 01000                   ONCE/GRADING PERIOD
004 T061303D (04            ) 00100                   ONCE OR TWICE/YEAR
005 T061303E (05            ) 00010                   NEVER OR HARDLY EVER
006 T061303M (M             ) 00001                   MISSING

CONDITIONING VARIABLE ID:     TSUB0033
DESCRIPTION:                  HOW OFTEN USE GROUP PROJECTS TO ACCESS?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061304                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061304A (01            ) 00000                   ONCE OR TWICE WEEK
002 T061304B (02            ) 10000                   ONCE OR TWICE MONTH
003 T061304C (03            ) 01000                   ONCE/GRADING PERIOD
004 T061304D (04            ) 00100                   ONCE OR TWICE/YEAR
005 T061304E (05            ) 00010                   NEVER OR HARDLY EVER
006 T061304M (M             ) 00001                   MISSING

CONDITIONING VARIABLE ID:     TSUB0034
DESCRIPTION:                  HOW OFTEN USE WORK PORTFOLIOS TO ACCESS?
GRADES/ASSESSMENTS:           N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T061305                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061305A (01            ) 00000                   ONCE OR TWICE WEEK
002 T061305B (02            ) 10000                   ONCE OR TWICE MONTH
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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003 T061305C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061305D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061305E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061305M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0035
DESCRIPTION:               HOW OFTEN USE IN CLASS ESSAYS TO ACCESS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061306                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061306A (01          ) 00000                      ONCE OR TWICE WEEK
002 T061306B (02          ) 10000                      ONCE OR TWICE MONTH
003 T061306C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061306D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061306E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061306M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0036
DESCRIPTION:               HOW OFTEN USE SELF/PEER EVAL TO ACCESS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061307                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061307A (01          ) 00000                      ONCE OR TWICE WEEK
002 T061307B (02          ) 10000                      ONCE OR TWICE MONTH
003 T061307C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061307D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061307E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061307M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0037
DESCRIPTION:               HOW OFTEN USE LAB NOTEBOOKS/JOURNALS TO ACCESS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061308                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061308A (01          ) 00000                      ONCE OR TWICE WEEK
002 T061308B (02          ) 10000                      ONCE OR TWICE MONTH
003 T061308C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061308D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061308E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061308M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0038
DESCRIPTION:               HOW OFTEN USE HOMEWORK TO ACCESS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061309                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061309A (01          ) 00000                      ONCE OR TWICE WEEK
002 T061309B (02          ) 10000                      ONCE OR TWICE MONTH
003 T061309C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061309D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061309E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061309M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0039
DESCRIPTION:               HOW OFTEN USE HANDS ON ACTIVITIES TO ACCESS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061310                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        5

001 T061310A (01          ) 00000                      ONCE OR TWICE WEEK
002 T061310B (02          ) 10000                      ONCE OR TWICE MONTH
003 T061310C (03          ) 01000                      ONCE/GRADING PERIOD
004 T061310D (04          ) 00100                      ONCE OR TWICE/YEAR
005 T061310E (05          ) 00010                      NEVER OR HARDLY EVER
006 T061310M (M           ) 00001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0040
DESCRIPTION:               PROPORTION OF EVAL IN SCI BASED ON HANDS ON ACTVS?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061401                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    5
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        4

001 T061401A (01          ) 0000                       MOST OR ALL OF GRADE
002 T061401B (02          ) 1000                       ABOUT HALF OF GRADE
003 T061401C (03          ) 0100                       VERY LITTLE OF GRADE
004 T061401D (04          ) 0010                       NONE OF GRADE
005 T061401M (M           ) 0001                       MISSING
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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

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CONDITIONING VARIABLE ID:  TSUB0041
DESCRIPTION:               BEST DESCRIPTION OF COMPUTER AVAILABILITY FOR SCI
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061501
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   7
                                                  NUMBER OF INDEPENDENT CONTRASTS:       6
001 T061501A (01         ) 000000
002 T061501B (02         ) 100000                 NONE AVAILABLE
003 T061501C (03         ) 010000                 1 IN CLASSROOM
004 T061501D (04         ) 001000                 2-3 IN CLASSROOM
005 T061501E (05         ) 000100                 4 IN CLASSROOM
006 T061501F (06         ) 000010                 IN LAB BUT DIFFICULT
007 T061501M (M          ) 000001                 IN LAB AND EASY
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0042
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: PLAYING SCI
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061601
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061601Y (01         ) 0
002 T061601M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0043
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: PLAYING SCI
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061611
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061611Y (01         ) 0
002 T061611M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0044
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: SIMULATIONS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061621
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061621Y (01         ) 0
002 T061621M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0045
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: DATA ANALYSIS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061631
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061631Y (01         ) 0
002 T061631M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0046
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: WORD PROCESS
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061641
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061641Y (01         ) 0
002 T061641M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0047
DESCRIPTION:               USE COMPUTERS FOR SCI INSTRUCTION: DO NOT USE
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061651
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
                                                  NUMBER OF INDEPENDENT CONTRASTS:       1
001 T061651Y (01         ) 0
002 T061651M (M          ) 1                      YES
                                                  MISSING

CONDITIONING VARIABLE ID:  TSUB0048
DESCRIPTION:               STUDS ASSIGNED TO CLASS BY ABILITY/ACHVMNT LEVEL?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061701
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
                                                  NUMBER OF INDEPENDENT CONTRASTS:       5
001 T061701A (01         ) 00000
002 T061701B (02         ) 10000                  NOT ASSIGNED BY ABIL
003 T061701C (03         ) 01000                  ASSIGNED BY MATN ABL
004 T061701D (04         ) 00100                  ASSIGNED BY READING
                                                  ASSIGNED BY SCIENCE
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
005 T061701E (05        ) 00010                    ASSIGNED BY GENERAL
006 T061701M (M         ) 00001                    MISSING

CONDITIONING VARIABLE ID:  TSUB0049
DESCRIPTION:               IF ASSIGNED BY ABILITY WHICH BEST DESCRIBES LEVEL?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061801                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       5

001 T061801A (01        ) 00000                    NOT ASSIGNED BY ABIL
002 T061801B (02        ) 10000                    MOSTLY HIGH ABILITY
003 T061801C (03        ) 01000                    MOSTLY AVERAGE ABIL
004 T061801D (04        ) 00100                    MOSTLY LOW ABILITY
005 T061801E (05        ) 00010                    MOSTLY MIXED ABILITY
006 T061801M (M         ) 00001                    MISSING

CONDITIONING VARIABLE ID:  TSUB0050
DESCRIPTION:               COMPOSITION OF CLASS ACCORDING TO GENDER?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T061901                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   4
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       3

001 T061901A (01        ) 000                      MIXED
002 T061901B (02        ) 100                      ALL MALE
003 T061901C (03        ) 010                      ALL FEMALE
004 T061901M (M         ) 001                      MISSING

CONDITIONING VARIABLE ID:  TSUB0051
DESCRIPTION:               HOW MUCH TIME CLASS SPEND ON LIFE SCIENCE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T062001                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 T062001A (01        ) 0000                     A LOT
002 T062001B (02        ) 1000                     SOME
003 T062001C (03        ) 0100                     LITTLE
004 T062001D (04        ) 0010                     NONE
005 T062001M (M         ) 0001                     MISSING

CONDITIONING VARIABLE ID:  TSUB0052
DESCRIPTION:               HOW MUCH TIME CLASS SPEND ON EARTH SCIENCE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T062002                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 T062002A (01        ) 0000                     A LOT
002 T062002B (02        ) 1000                     SOME
003 T062002C (03        ) 0100                     LITTLE
004 T062002D (04        ) 0010                     NONE
005 T062002M (M         ) 0001                     MISSING

CONDITIONING VARIABLE ID:  TSUB0053
DESCRIPTION:               HOW MUCH TIME CLASS SPEND ON PHYSICAL SCIENCE?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T062003                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 T062003A (01        ) 0000                     A LOT
002 T062003B (02        ) 1000                     SOME
003 T062003C (03        ) 0100                     LITTLE
004 T062003D (04        ) 0010                     NONE
005 T062003M (M         ) 0001                     MISSING

CONDITIONING VARIABLE ID:  TSUB0054
DESCRIPTION:               WHICH BEST DESCRIBES SPACE WHERE CLASS TAUGHT?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T062101                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   5
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       4

001 T062101A (01        ) 0000                     CLASS ONLY
002 T062101B (02        ) 1000                     CLASS W/ H2O ACCESS
003 T062101C (03        ) 0100                     CLASS W/ LAB ACCESS
004 T062101D (04        ) 0010                     LAB W/ H2O ACCESS
005 T062101M (M         ) 0001                     MISSING

CONDITIONING VARIABLE ID:  TSUB0055
DESCRIPTION:               DO STUDS PRODUCE NOTEBOOKS/REPORTS OF LAB WORK?
GRADES/ASSESSMENTS:        N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   T062201                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
 001 T062201Y (01         ) 0                        YES
 002 T062201M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0056
 DESCRIPTION:               DO STUDS PRODUCE REPORTS OF EXTENDED SCI PROJECTS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062202                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062202Y (01         ) 0                        YES
 002 T062202M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0057
 DESCRIPTION:               DO STUDS PRODUCE REPORTS ON SPECIFIC TOPIC/ISSUE?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062203                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062203Y (01         ) 0                        YES
 002 T062203M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0058
 DESCRIPTION:               DO STUDS PRODUCE REPORTS/RECORDS OF FIELD TRIPS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062204                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062204Y (01         ) 0                        YES
 002 T062204M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0059
 DESCRIPTION:               DO STUDS PRODUCE JOURNALS/DIARIES/LOGS OF IDEAS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062205                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062205Y (01         ) 0                        YES
 002 T062205M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0060
 DESCRIPTION:               DO STUDS PRODUCE PHOTO RECORDS OF PROJECTS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062206                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062206Y (01         ) 0                        YES
 002 T062206M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0061
 DESCRIPTION:               DO STUDS PRODUCE AUDIO/VIDEOTAPE RECORDS OF ACTVS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062207                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062207Y (01         ) 0                        YES
 002 T062207M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0062
 DESCRIPTION:               DO STUDS PRODUCE REPORTS OF PERSONAL INTERVIEWS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062208                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062208Y (01         ) 0                        YES
 002 T062208M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0063
 DESCRIPTION:               DO STUDS PRODUCE 3D SCI MODELS?
 GRADES/ASSESSMENTS:        N04, N08, S08
 CONDITIONING VAR LABEL:
 NAEP ID:                   T062209                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
 TYPE OF CONTRAST:          CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

 001 T062209Y (01         ) 0                        YES
 002 T062209M (M          ) 1                        MISSING

 CONDITIONING VARIABLE ID:  TSUB0064
 DESCRIPTION:               DO STUDS PRODUCE COMP GENERATED MULTMEDIA PROJECTS
 GRADES/ASSESSMENTS:        N04, N08, S08
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VAR LABEL:
NAEP ID:                    T062210            TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        1

001 T062210Y (01          ) 0                  YES
002 T062210M (M           ) 1                  MISSING

CONDITIONING VARIABLE ID:   TSUB0065
DESCRIPTION:                TIME PER WEEK EXPECT STUD TO SPEND ON HOMEWORK?
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T062301            TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        5

001 T062301A (01          ) 00000              NONE
002 T062301B (02          ) 10000              1/2 HOUR
003 T062301C (03          ) 01000              1 HOUR
004 T062301D (04          ) 00100              2 HOURS
005 T062301E (05          ) 00010              MORE THAN 2 HOURS
006 T062301M (M           ) 00001              MISSING

CONDITIONING VARIABLE ID:   TSUB0066
DESCRIPTION:                CLASS PERIOD AND # OF STUDS IN CLASS
GRADES/ASSESSMENTS:         N04, N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    T062401            TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        5

001 T062401A (01          ) 00000              1-20 STUDENTS
002 T062401B (02          ) 10000              21025 STUDENTS
003 T062401C (03          ) 01000              26-30 STUDENTS
004 T062401D (04          ) 00100              31-35 STUDENTS
005 T062401E (05          ) 00010              36 OR MORE STUDENTS
006 T062401M (M           ) 00001              MISSING

CONDITIONING VARIABLE ID:   SCHL0087
DESCRIPTION:                BEST DESCRIBES HOW 8TH GRADES ARE ORGANIZED?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034201            TOTAL NUMBER OF SPECIFIED CONTRASTS:    4
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        3

001 C034201A (01          ) 000                SELF-CONTAINED
002 C034201B (02          ) 100                SEMI-DEPARTMENTALIZE
003 C034201C (03          ) 010                DEPARTMENTALIZED
004 C034201M (M           ) 001                MISSING

CONDITIONING VARIABLE ID:   SCHL0088
DESCRIPTION:                ARE 8TH-GRADERS ASSIGNED TO MATH BY ABILITY?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034402            TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        2

001 C034402Y (01          ) 00                 YES
002 C034402N (02          ) 10                 NO
003 C034402M (M           ) 01                 MISSING

CONDITIONING VARIABLE ID:   SCHL0089
DESCRIPTION:                ARE 8TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034403            TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        2

001 C034403Y (01          ) 00                 YES
002 C034403N (02          ) 10                 NO
003 C034403M (M           ) 01                 MISSING

CONDITIONING VARIABLE ID:   SCHL0090
DESCRIPTION:                ARE 8TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034401            TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        2

001 C034401Y (01          ) 00                 YES
002 C034401N (02          ) 10                 NO
003 C034401M (M           ) 01                 MISSING

CONDITIONING VARIABLE ID:   SCHL0091
DESCRIPTION:                ARE 8TH-GRADERS ASSIGNED TO ARTS BY ABILITY?
GRADES/ASSESSMENTS:         N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                    C034406            TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:           CLASS              NUMBER OF INDEPENDENT CONTRASTS:        2
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 C034406Y (01           ) 00                        YES
002 C034406N (02           ) 10                        NO
003 C034406M (M            ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0092
DESCRIPTION:               HOW OFTEN 8TH GRDS RECEIVE COMP SCI INSTRUCTION?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C034510                     TOTAL NUMBER OF SPEC'FIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       5

001 C034510A (01           ) 00000                     EVERY DAY
002 C034510B (02           ) 10000                     3 OR 4 TIMES A WEEK
003 C034510C (03           ) 01000                     ONCE OR TWICE/WEEK
004 C034510D (04           ) 00100                     LESS THAN ONCE/WEEK
005 C034510E (05           ) 00010                     SUBJECT NOT TAUGHT
006 C034510M (M            ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0093
DESCRIPTION:               HOW OFTEN 8TH GRDS RECEIVE MATH INSTRUCTION?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C034511                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       5

001 C034511A (01           ) 00000                     EVERY DAY
002 C034511B (02           ) 10000                     3 OR 4 TIMES A WEEK
003 C034511C (03           ) 01000                     ONCE OR TWICE/WEEK
004 C034511D (04           ) 00100                     LESS THAN ONCE/WEEK
005 C034511E (05           ) 00010                     SUBJECT NOT TAUGHT
006 C034511M (M            ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0094
DESCRIPTION:               HOW OFTEN 8TH GRDS RECEIVE SCIENCE INSTRUCTION?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C034512                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       5

001 C034512A (01           ) 00000                     EVERY DAY
002 C034512B (02           ) 10000                     3 OR 4 TIMES A WEEK
003 C034512C (03           ) 01000                     ONCE OR TWICE/WEEK
004 C034512D (04           ) 00100                     LESS THAN ONCE/WEEK
005 C034512E (05           ) 00010                     SUBJECT NOT TAUGHT
006 C034512M (M            ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0095
DESCRIPTION:               HOW OFTEN 8TH GRDS RECEIVE ENGLISH INSTRUCTION?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C034513                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       5

001 C034513A (01           ) 00000                     EVERY DAY
002 C034513B (02           ) 10000                     3 OR 4 TIMES A WEEK
003 C034513C (03           ) 01000                     ONCE OR TWICE/WEEK
004 C034513D (04           ) 00100                     LESS THAN ONCE/WEEK
005 C034513E (05           ) 00010                     SUBJECT NOT TAUGHT
006 C034513M (M            ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0096
DESCRIPTION:               HOW OFTEN 8TH GRDS RECEIVE ARTS INSTRUCTION?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C034514                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   6
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       5

001 C034514A (01           ) 00000                     EVERY DAY
002 C034514B (02           ) 10000                     3 OR 4 TIMES A WEEK
003 C034514C (03           ) 01000                     ONCE OR TWICE/WEEK
004 C034514D (04           ) 00100                     LESS THAN ONCE/WEEK
005 C034514E (05           ) 00010                     SUBJECT NOT TAUGHT
006 C034514M (M            ) 00001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0097
DESCRIPTION:               HAS ENGLISH BEEN IDENTIFIED AS A PRIORITY?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C031611                     TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:          CLASS                       NUMBER OF INDEPENDENT CONTRASTS:       2

001 C031611Y (01           ) 00                        YES
002 C031611N (02           ) 10                        NO
003 C031611M (M            ) 01                        MISSING

CONDITIONING VARIABLE ID:  SCHL0098
DESCRIPTION:               SCHOOL OFFER 8TH GR STUDS ALGEBRA FOR HS CREDIT?
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C034601                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   3
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       2

001 C034601Y (01         ) 00                         YES
002 C034601N (02         ) 10                         NO
003 C034601M (M          ) 01                         MISSING

CONDITIONING VARIABLE ID:    SCHL0099
DESCRIPTION:                 SCHOOL W/ SPECIAL FOCUS ON ENGLISH?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037203                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037203Y (01         ) 0                          YES
002 C037203M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0100
DESCRIPTION:                 SCHOOL FOLLOW DISTRICT/STATE ENGLISH CURRICULUM?
GRADES/ASSESSMENTS:          N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                     C037306                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C037306Y (01         ) 0                          YES
002 C037306M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0101
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR MATH?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039401                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039401Y (01         ) 0                          YES
002 C039401M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0102
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR SCIENCE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039402                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039402Y (01         ) 0                          YES
002 C039402M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0103
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR READING?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039403                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039403Y (01         ) 0                          YES
002 C039403M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0104
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR ARTS?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039404                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039404Y (01         ) 0                          YES
002 C039404M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0105
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR OTHER?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039405                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039405Y (01         ) 0                          YES
002 C039405M (M          ) 1                          MISSING

CONDITIONING VARIABLE ID:    SCHL0106
DESCRIPTION:                 SCHOOL SPONSER 8TH GRDS FIELD TRIP FOR NONE ABOVE?
GRADES/ASSESSMENTS:          N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                     C039406                  TOTAL NUMBER OF SPECIFIED CONTRASTS:   2
TYPE OF CONTRAST:            CLASS                    NUMBER OF INDEPENDENT CONTRASTS:       1

001 C039406Y (01         ) 0                          YES
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
002 C039406M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0107
DESCRIPTION:               8TH GRADERS IN EXTRACURR ACTS FOR MATH?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039501                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039501Y (01         ) 0                       YES
002 C039501M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0108
DESCRIPTION:               8TH GRADERS IN EXTRACURR ACTS FOR SCIENCE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039502                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039502Y (01         ) 0                       YES
002 C039502M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0109
DESCRIPTION:               8TH GRADERS IN EXTRACURR ACTS FOR ENG/LANG ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039503                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039503Y (01         ) 0                       YES
002 C039503M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0110
DESCRIPTION:               8TH GRADERS IN EXTRACURR ACTS FOR ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039504                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039504Y (01         ) 0                       YES
002 C039504M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0111
DESCRIPTION:               8TH GRADERS IN EXTRACURR ACTS FOR NONE OF ABOVE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039505                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039505Y (01         ) 0                       YES
002 C039505M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0112
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039601                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039601Y (01         ) 0                       YES
002 C039601M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0113
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039602                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039602Y (01         ) 0                       YES
002 C039602M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0114
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039603                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C039603Y (01         ) 0                       YES
002 C039603M (M          ) 1                       MISSING

CONDITIONING VARIABLE ID:  SCHL0115
DESCRIPTION:               8TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   C039604                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      1

001 C039604Y (01          ) 0                            YES
002 C039604M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0116
DESCRIPTION:                  8TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C039605                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  2
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      1

001 C039605Y (01          ) 0                            YES
002 C039605M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:     SCHL0117
DESCRIPTION:                  WHAT % OF 8TH GRDS HELD BACK/REPEAT 8TH GRADE?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      C041901                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  6
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      5

001 C041901A (01          ) 00000                        0%
002 C041901B (02          ) 10000                        1-2%
003 C041901C (03          ) 01000                        3-5%
004 C041901D (04          ) 00100                        6-10%
005 C041901E (05          ) 00010                        MORE THAN 10%
006 C041901M (M           ) 00001                        MISSING

CONDITIONING VARIABLE ID:     TCHR0121
DESCRIPTION:                  COUNTING THIS YR, HOW MANY YRS TOTAL TAUGHT SCI?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T062501                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  6
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      5

001 T062501A (01          ) 00000                        2 YEARS OR LESS
002 T062501B (02          ) 10000                        3-5 YEARS
003 T062501C (03          ) 01000                        6-10 YEARS
004 T062501D (04          ) 00100                        11-24 YEARS
005 T062501E (05          ) 00010                        25 YEARS OR MORE
006 T062501M (M           ) 00001                        MISSING

CONDITIONING VARIABLE ID:     TCHR0122
DESCRIPTION:                  LAST YR, TIME IN PRO WORKSHOPS/SEMS IN SCI?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T062601                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  6
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      5

001 T062601A (01          ) 00000                        NONE
002 T062601B (02          ) 10000                        LESS THAN 6 HOURS
003 T062601C (03          ) 01000                        6-15 HOURS
004 T062601D (04          ) 00100                        16-35 HOURS
005 T062601E (05          ) 00010                        MORE THAN 35 HOURS
006 T062601M (M           ) 00001                        MISSING

CONDITIONING VARIABLE ID:     TCHR0123
DESCRIPTION:                  LAST 2 YRS, # OF UNIV COURSES IN SCI/SCI ED?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T062701                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  6
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      5

001 T062701A (01          ) 00000                        NONE
002 T062701B (02          ) 10000                        ONE
003 T062701C (03          ) 01000                        TWO
004 T062701D (04          ) 00100                        THREE
005 T062701E (05          ) 00010                        FOUR OR MORE
006 T062701M (M           ) 00001                        MISSING

CONDITIONING VARIABLE ID:     TCHR0124
DESCRIPTION:                  CURRICULUM SPECIALIST TO HELP/ADVISE IN SCI?
GRADES/ASSESSMENTS:           N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                      T062801                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  3
TYPE OF CONTRAST:             CLASS                      NUMBER OF INDEPENDENT CONTRASTS:      2

001 T062801Y (01          ) 00                           YES
002 T062801N (02          ) 10                           NO
003 T062801M (M           ) 01                           MISSING

CONDITIONING VARIABLE ID:     SCHL0118
DESCRIPTION:                  ARE 12TH-GRADERS ASSIGNED TO MATH BY ABILITY?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C035002                    TOTAL NUMBER OF SPECIFIED CONTRASTS:  3
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:              CLASS                    NUMBER OF INDEPENDENT CONTRASTS:          2

001 C035002Y (01           ) 00                         YES
002 C035002N (02           ) 10                         NO
003 C035002M (M            ) 01                         MISSING

CONDITIONING VARIABLE ID:  SCHL0119
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO SCIENCE BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035003                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          2

001 C035003Y (01           ) 00                         YES
002 C035003N (02           ) 10                         NO
003 C035003M (M            ) 01                         MISSING

CONDITIONING VARIABLE ID:  SCHL0120
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO ENGLISH BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035006                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          2

001 C035006Y (01           ) 00                         YES
002 C035006N (02           ) 10                         NO
003 C035006M (M            ) 01                         MISSING

CONDITIONING VARIABLE ID:  SCHL0121
DESCRIPTION:               ARE 12TH-GRADERS ASSIGNED TO ARTS BY ABILITY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C035007                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      3
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          2

001 C035007Y (01           ) 00                         YES
002 C035007N (02           ) 10                         NO
003 C035007M (M            ) 01                         MISSING

CONDITIONING VARIABLE ID:  SCHL0122
DESCRIPTION:               FROM 9TH ON HOW MANY YRS REQUIRED FOR MATH?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040201                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040201A (01           ) 0000000                    NONE
002 C040201B (02           ) 1000000                    ONE HALF YEAR
003 C040201C (03           ) 0100000                    ONE YEAR
004 C040201D (04           ) 0010000                    TWO YEARS
005 C040201E (05           ) 0001000                    THREE YEARS
006 C040201F (06           ) 0000100                    FOUR YEARS
007 C040201G (07           ) 0000010                    MORE THAN FOUR YEARS
008 C040201M (M            ) 0000001                    MISSING

CONDITIONING VARIABLE ID:  SCHL0123
DESCRIPTION:               FROM 9TH ON HOW MANY YRS REQUIRED FOR SCIENCE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040202                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040202A (01           ) 0000000                    NONE
002 C040202B (02           ) 1000000                    ONE HALF YEAR
003 C040202C (03           ) 0100000                    ONE YEAR
004 C040202D (04           ) 0010000                    TWO YEARS
005 C040202E (05           ) 0001000                    THREE YEARS
006 C040202F (06           ) 0000100                    FOUR YEARS
007 C040202G (07           ) 0000010                    MORE THAN FOUR YEARS
008 C040202M (M            ) 0000001                    MISSING

CONDITIONING VARIABLE ID:  SCHL0124
DESCRIPTION:               FROM 9TH ON HOW MANY YRS REQUIRED FOR ENG/LIT?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040203                      TOTAL NUMBER OF SPECIFIED CONTRASTS:      8
TYPE OF CONTRAST:          CLASS                        NUMBER OF INDEPENDENT CONTRASTS:          7

001 C040203A (01           ) 0000000                    NONE
002 C040203B (02           ) 1000000                    ONE HALF YEAR
003 C040203C (03           ) 0100000                    ONE YEAR
004 C040203D (04           ) 0010000                    TWO YEARS
005 C040203E (05           ) 0001000                    THREE YEARS
006 C040203F (06           ) 0000100                    FOUR YEARS
007 C040203G (07           ) 0000010                    MORE THAN FOUR YEARS
008 C040203M (M            ) 0000001                    MISSING
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
CONDITIONING VARIABLE ID:  SCHL0125
DESCRIPTION:               FROM 9TH ON HOW MANY YRS REQUIRED FINE/PERF ARTS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040204                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040204A (01        ) 0000000                  NONE
002 C040204B (02        ) 1000000                  ONE HALF YEAR
003 C040204C (03        ) 0100000                  ONE YEAR
004 C040204D (04        ) 0010000                  TWO YEARS
005 C040204E (05        ) 0001000                  THREE YEARS
006 C040204F (06        ) 0000100                  FOUR YEARS
007 C040204G (07        ) 0000010                  MORE THAN FOUR YEARS
008 C040204M (M         ) 0000001                  MISSING

CONDITIONING VARIABLE ID:  SCHL0126
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED BIO?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040301                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040301Y (01        ) 0                        YES
002 C040301M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0127
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN ADVANCED CHEM?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040302                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040302Y (01        ) 0                        YES
002 C040302M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0128
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN ADV PHYSICS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040303                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040303Y (01        ) 0                        YES
002 C040303M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0129
DESCRIPTION:               NO ADVANCED SCIENCE COURSES TAUGHT
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040304                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040304Y (01        ) 0                        YES
002 C040304M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0130
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN COMP SCI?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040305                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040305Y (01        ) 0                        YES
002 C040305M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0131
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN CALCULUS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040306                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040306Y (01        ) 0                        YES
002 C040306M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0132
DESCRIPTION:               COURSES 1 OR > SEMESTERS TAUGHT IN TRIGONOMETRY?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C040307                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040307Y (01        ) 0                        YES
002 C040307M (M         ) 1                        MISSING

CONDITIONING VARIABLE ID:  SCHL0133
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                  COURSES 1 OR > SEMESTERS TAUGHT IN PRECALCULUS?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040308                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040308Y (01            ) 0                      YES
002 C040308M (M             ) 1                      MISSING

CONDITIONING VARIABLE ID:     SCHL0134
DESCRIPTION:                  COURSES 1 OR > SEMESTERS TAUGHT IN PROB/STAT?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040309                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040309Y (01            ) 0                      YES
002 C040309M (M             ) 1                      MISSING

CONDITIONING VARIABLE ID:     SCHL0135
DESCRIPTION:                  COURSES 1 OR > SEMESTERS TAUGHT IN UNI/INTEG MATH?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040310                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040310Y (01            ) 0                      YES
002 C040310M (M             ) 1                      MISSING

CONDITIONING VARIABLE ID:     SCHL0136
DESCRIPTION:                  NO ADVANCED MATH COURSES TAUGHT?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040311                TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040311Y (01            ) 0                      YES
002 C040311M (M             ) 1                      MISSING

CONDITIONING VARIABLE ID:     SCHL0137
DESCRIPTION:                  STUDS REQUIRED TO PASS STATE TEST IN MATH?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040401                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C040401Y (01            ) 00                     YES
002 C040401N (02            ) 10                     NO
003 C040401M (M             ) 01                     MISSING

CONDITIONING VARIABLE ID:     SCHL0138
DESCRIPTION:                  STUDS REQUIRED TO PASS STATE TEST IN SCIENCE?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040402                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C040402Y (01            ) 00                     YES
002 C040402N (02            ) 10                     NO
003 C040402M (M             ) 01                     MISSING

CONDITIONING VARIABLE ID:     SCHL0139
DESCRIPTION:                  STUDS REQUIRED TO PASS STATE TEST IN ENG/LANG ARTS
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040403                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C040403Y (01            ) 00                     YES
002 C040403N (02            ) 10                     NO
003 C040403M (M             ) 01                     MISSING

CONDITIONING VARIABLE ID:     SCHL0140
DESCRIPTION:                  STUDS REQUIRED TO PASS STATE TEST IN FINE/PERF ART
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040404                TOTAL NUMBER OF SPECIFIED CONTRASTS:    3
TYPE OF CONTRAST:             CLASS                  NUMBER OF INDEPENDENT CONTRASTS:        2

001 C040404Y (01            ) 00                     YES
002 C040404N (02            ) 10                     NO
003 C040404M (M             ) 01                     MISSING

CONDITIONING VARIABLE ID:     SCHL0141
DESCRIPTION:                  SCHOOL SPONSER 12TH GR FIELD TRIPS FOR MATH?
GRADES/ASSESSMENTS:           N12
CONDITIONING VAR LABEL:
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
NAEP ID:                      C040501                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040501Y (01          ) 0                         YES
002 C040501M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0142
DESCRIPTION:               SCHOOL SPONSER 12TH GR FIELD TRIPS FOR SCIENCE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040502                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040502Y (01          ) 0                         YES
002 C040502M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0143
DESCRIPTION:               SCHOOL SPONSER 12TH GR FIELD TRIPS IN ENG/LANG ART
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040503                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040503Y (01          ) 0                         YES
002 C040503M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0144
DESCRIPTION:               SCHOOL SPONSER 12TH GR FIELD TRIPS IN ARTS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040504                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040504Y (01          ) 0                         YES
002 C040504M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0145
DESCRIPTION:               SCHOOL SPONSER 12TH GR FIELD TRIPS IN OTHER?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040505                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040505Y (01          ) 0                         YES
002 C040505M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0146
DESCRIPTION:               SCHOOL SPONSER 12TH GR FIELD TRIPS IN NONE ABOVE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040506                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040506Y (01          ) 0                         YES
002 C040506M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0147
DESCRIPTION:               12TH GRADERS IN EXTRACURR ACTS IN MATH?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040601                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040601Y (01          ) 0                         YES
002 C040601M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0148
DESCRIPTION:               12TH GRADERS IN EXTRACURR ACTS IN SCIENCE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040602                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040602Y (01          ) 0                         YES
002 C040602M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0149
DESCRIPTION:               12TH GRADERS IN EXTRACURR ACTS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                      C040603                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:             CLASS                   NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040603Y (01          ) 0                         YES
002 C040603M (M           ) 1                         MISSING

CONDITIONING VARIABLE ID:  SCHL0150
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                 12TH GRADERS IN EXTRACURR ACTS IN ARTS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040604                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040604Y (01          ) 0                            YES
002 C040604M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0151
DESCRIPTION:                 12TH GRADERS IN EXTRACURR ACTS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040605                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040605Y (01          ) 0                            YES
002 C040605M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0152
DESCRIPTION:                 12TH GRADERS IN SUMMER PROGRAMS IN MATH?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040701                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040701Y (01          ) 0                            YES
002 C040701M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0153
DESCRIPTION:                 12TH GRADERS IN SUMMER PROGRAMS IN SCIENCE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040702                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040702Y (01          ) 0                            YES
002 C040702M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0154
DESCRIPTION:                 12TH GRADERS IN SUMMER PORGRAMS IN ENG/LANG ARTS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040703                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040703Y (01          ) 0                            YES
002 C040703M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0155
DESCRIPTION:                 12TH GRADERS IN SUMMER PROGRAMS IN ARTS?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040704                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040704Y (01          ) 0                            YES
002 C040704M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0156
DESCRIPTION:                 12TH GRADERS IN SUMMER PROGRAMS IN NONE OF ABOVE?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040705                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040705Y (01          ) 0                            YES
002 C040705M (M           ) 1                            MISSING

CONDITIONING VARIABLE ID:    SCHL0157
DESCRIPTION:                 # STUDS ENROLLED IN AP SCIENCE COURSES?
GRADES/ASSESSMENTS:          N12
CONDITIONING VAR LABEL:
NAEP ID:                     C040801                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:            CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040801A (01          ) 0000000                      NONE
002 C040801B (02          ) 1000000                      1-10
003 C040801C (03          ) 0100000                      11-25
004 C040801D (04          ) 0010000                      26-50
005 C040801E (05          ) 0001000                      51-75
006 C040801F (06          ) 0000100                      76-99
007 C040801G (07          ) 0000010                      100 OR MORE
008 C040801M (M           ) 0000001                      MISSING

CONDITIONING VARIABLE ID:    SCHL0158
DESCRIPTION:                 # STUDS ENROLLED IN AP CALCULUS COURSES?
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040802                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040802A (01       ) 0000000                     NONE
002 C040802B (02       ) 1000000                     1-10
003 C040802C (03       ) 0100000                     11-25
004 C040802D (04       ) 0010000                     26-50
005 C040802E (05       ) 0001000                     51-75
006 C040802F (06       ) 0000100                     76-99
007 C040802G (07       ) 0000010                     100 OR MORE
008 C040802M (M        ) 0000001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0159
DESCRIPTION:             # STUDS ENROLLED IN AP COMP SCI COURSES?
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040803                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040803A (01       ) 0000000                     NONE
002 C040803B (02       ) 1000000                     1-10
003 C040803C (03       ) 0100000                     11-25
004 C040803D (04       ) 0010000                     26-50
005 C040803E (05       ) 0001000                     51-75
006 C040803F (06       ) 0000100                     76-99
007 C040803G (07       ) 0000010                     100 OR MORE
008 C040803M (M        ) 0000001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0160
DESCRIPTION:             # STUDS ENROLLED IN AP ENGLISH COURSES?
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040804                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    8
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        7

001 C040804A (01       ) 0000000                     NONE
002 C040804B (02       ) 1000000                     1-10
003 C040804C (03       ) 0100000                     11-25
004 C040804D (04       ) 0010000                     26-50
005 C040804E (05       ) 0001000                     51-75
006 C040804F (06       ) 0000100                     76-99
007 C040804G (07       ) 0000010                     100 OR MORE
008 C040804M (M        ) 0000001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0161
DESCRIPTION:             ANY 12TH GRDS TAKING COLLEGE COURSES IN MATH?
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040901                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040901Y (01       ) 0                           YES
002 C040901M (M        ) 1                           MISSING

CONDITIONING VARIABLE ID:  SCHL0162
DESCRIPTION:             ANY 12TH GRDS TAKING COLLEGE COURSES IN SCIENCE?
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040902                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040902Y (01       ) 0                           YES
002 C040902M (M        ) 1                           MISSING

CONDITIONING VARIABLE ID:  SCHL0163
DESCRIPTION:             ANY 12TH GRDS TAKING COLLEGE COURSES ENG/LANG ARTS
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040903                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040903Y (01       ) 0                           YES
002 C040903M (M        ) 1                           MISSING

CONDITIONING VARIABLE ID:  SCHL0164
DESCRIPTION:             ANY 12TH GRDS TAKING COLLEGE COURSES IN ARTS?
GRADES/ASSESSMENTS:      N12
CONDITIONING VAR LABEL:
NAEP ID:                 C040904                     TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:        CLASS                       NUMBER OF INDEPENDENT CONTRASTS:        1

001 C040904Y (01       ) 0                           YES
002 C040904M (M        ) 1                           MISSING

CONDITIONING VARIABLE ID:  SCHL0165
```

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Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
DESCRIPTION:                   ANY 12TH GRDS TAKING COLLEGE COURSES IN NONE ABOVE
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C040905
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                        NUMBER OF INDEPENDENT CONTRASTS:        1
001 C040905Y (01            ) 0
002 C040905M (M             ) 1                         YES
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0166
DESCRIPTION:                   WHAT % 12TH GRDS HELD BACK AND REPEAT 12TH GRADE?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C041001
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                        NUMBER OF INDEPENDENT CONTRASTS:        5
001 C041001A (01            ) 00000
002 C041001B (02            ) 10000                     0%
003 C041001C (03            ) 01000                     1-2%
004 C041001D (04            ) 00100                     3-5%
005 C041001E (05            ) 00010                     6-10%
006 C041001M (M             ) 00001                     MORE THAN 10%
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0167
DESCRIPTION:                   LAST YR WHAT % OF 12TH GRDS GRADUATED?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C041101
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    6
                                                        NUMBER OF INDEPENDENT CONTRASTS:        5
001 C041101A (01            ) 00000
002 C041101B (02            ) 10000                     99-100%
003 C041101C (03            ) 01000                     95-98%
004 C041101D (04            ) 00100                     90-94%
005 C041101E (05            ) 00010                     75-89%
006 C041101M (M             ) 00001                     LESS THAN 75%
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0168
DESCRIPTION:                   WHAT % OF GRADUATING CLASS NOW IN 2-YR COLLEGE?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C036001
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
                                                        NUMBER OF INDEPENDENT CONTRASTS:        6
001 C036001A (01            ) 000000
002 C036001B (02            ) 100000                    0-10%
003 C036001C (03            ) 010000                    11-25%
004 C036001D (04            ) 001000                    26-50%
005 C036001E (05            ) 000100                    51-75%
006 C036001F (06            ) 000010                    76-90%
007 C036001M (M             ) 000001                    91-100%
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0169
DESCRIPTION:                   WHAT % OF GRADUATING CLASS NOW IN 4-YR COLLEGE?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C036002
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
                                                        NUMBER OF INDEPENDENT CONTRASTS:        6
001 C036002A (01            ) 000000
002 C036002B (02            ) 100000                    0-10%
003 C036002C (03            ) 010000                    11-25%
004 C036002D (04            ) 001000                    26-50%
005 C036002E (05            ) 000100                    51-75%
006 C036002F (06            ) 000010                    76-90%
007 C036002M (M             ) 000001                    91-100%
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0170
DESCRIPTION:                   WHAT % OF GRADUATING CLASS NOW IN VO-TEC SCHOOL?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C036003
TYPE OF CONTRAST:              CLASS                    TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
                                                        NUMBER OF INDEPENDENT CONTRASTS:        6
001 C036003A (01            ) 000000
002 C036003B (02            ) 100000                    0-10%
003 C036003C (03            ) 010000                    11-25%
004 C036003D (04            ) 001000                    26-50%
005 C036003E (05            ) 000100                    51-75%
006 C036003F (06            ) 000010                    76-90%
007 C036003M (M             ) 000001                    91-100%
                                                        MISSING

CONDITIONING VARIABLE ID:      SCHL0171
DESCRIPTION:                   WHAT % OF GRAD CLASS NOW IN EMPLOYER TRAINING?
GRADES/ASSESSMENTS:            N12
CONDITIONING VAR LABEL:
NAEP ID:                       C036004                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    7
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          6

001 C036004A (01         ) 000000                     0-10%
002 C036004B (02         ) 100000                     11-25%
003 C036004C (03         ) 010000                     26-50%
004 C036004D (04         ) 001000                     51-75%
005 C036004E (05         ) 000100                     76-90%
006 C036004F (06         ) 000010                     91-100%
007 C036004M (M          ) 000001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0172
DESCRIPTION:               % OF GRADUATING CLASS NOW IN MILITARY SERVICE?
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   C036005                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      7
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          6

001 C036005A (01         ) 000000                     0-10%
002 C036005B (02         ) 100000                     11-25%
003 C036005C (03         ) 010000                     26-50%
004 C036005D (04         ) 001000                     51-75%
005 C036005E (05         ) 000100                     76-90%
006 C036005F (06         ) 000010                     91-100%
007 C036005M (M          ) 000001                     MISSING

CONDITIONING VARIABLE ID:  SCHL0173
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 NATLUNCM (M          ) 0                          MISSING
002 NATLUNCH (@          ) 1                          PERCENT

CONDITIONING VARIABLE ID:  SCHL0174
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      1
TYPE OF CONTRAST:          LINEAR                     NUMBER OF INDEPENDENT CONTRASTS:          1

001 NATLUNCL (0-100,M=0  )  0.0 +  1.0*X              LINEAR

CONDITIONING VARIABLE ID:  SCHL0175
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 REMREADM (M          ) 0                          MISSING
002 REM READ (@          ) 1                          PERCENT

CONDITIONING VARIABLE ID:  SCHL0176
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      1
TYPE OF CONTRAST:          LINEAR                     NUMBER OF INDEPENDENT CONTRASTS:          1

001 REMREADL (0-100,M=0  )  0.0 +  1.0*X              LINEAR

CONDITIONING VARIABLE ID:  SCHL0177
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
TYPE OF CONTRAST:          CLASS                      NUMBER OF INDEPENDENT CONTRASTS:          1

001 REMMATHM (M          ) 0                          MISSING
002 REM MATH (@          ) 1                          PERCENT

CONDITIONING VARIABLE ID:  SCHL0178
DESCRIPTION:               PERCENT OF STUDENTS WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04, N08, S08, N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHSC                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      1
TYPE OF CONTRAST:          LINEAR                     NUMBER OF INDEPENDENT CONTRASTS:          1

001 REMMATHL (0-100,M=0  )  0.0 +  1.0*X              LINEAR

CONDITIONING VARIABLE ID:  SCHL0179
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                    TOTAL NUMBER OF SPECIFIED CONTRASTS:      2
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
TYPE OF CONTRAST:             CLASS
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 NATLUN4M (M          ) 0
002 NATLUN4  (@          ) 1                      MISSING
                                                  PERCENT

CONDITIONING VARIABLE ID:  SCHL0180
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR
TYPE OF CONTRAST:          LINEAR                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 NATLUN4L (0-100,M=0  )  0.0 +  1.0*X
                                                  LINEAR

CONDITIONING VARIABLE ID:  SCHL0181
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 REMREA4M (M          ) 0
002 REMREAD4 (@          ) 1                      MISSING
                                                  PERCENT

CONDITIONING VARIABLE ID:  SCHL0182
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR
TYPE OF CONTRAST:          LINEAR                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 REMREA4L (0-100,M=0  )  0.0 +  1.0*X
                                                  LINEAR

CONDITIONING VARIABLE ID:  SCHL0183
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 REMMAT4M (M          ) 0
002 REMMATH4 (@          ) 1                      MISSING
                                                  PERCENT

CONDITIONING VARIABLE ID:  SCHL0184
DESCRIPTION:               PERCENT OF STUDENTS IN 4TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N04, S04
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR
TYPE OF CONTRAST:          LINEAR                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 REMMAT4L (0-100,M=0  )  0.0 +  1.0*X
                                                  LINEAR

CONDITIONING VARIABLE ID:  SCHL0185
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 NATLUN8M (M          ) 0
002 NATLUN8  (@          ) 1                      MISSING
                                                  PERCENT

CONDITIONING VARIABLE ID:  SCHL0186
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR
TYPE OF CONTRAST:          LINEAR                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 NATLUN8L (0-100,M=0  )  0.0 +  1.0*X
                                                  LINEAR

CONDITIONING VARIABLE ID:  SCHL0187
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR
TYPE OF CONTRAST:          CLASS                  TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
001 REMREA8M (M          ) 0
002 REMREAD8 (@          ) 1                      MISSING
                                                  PERCENT

CONDITIONING VARIABLE ID:  SCHL0188
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR
TYPE OF CONTRAST:          LINEAR                 TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
                                                  NUMBER OF INDEPENDENT CONTRASTS:        1
```

Table C-5 (continued)

Conditioning Variables Specific to the 1996 Science Assessment

```
001 REMREA8L (0-100,M=0  )  0.0 +  1.0*X                   LINEAR

CONDITIONING VARIABLE ID:  SCHL0189
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8M (M          ) 0                               MISSING
002 REMMATH8 (@          ) 1                               PERCENT

CONDITIONING VARIABLE ID:  SCHL0190
DESCRIPTION:               PERCENT OF STUDENTS IN 8TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N08, S08
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMAT8L (0-100,M=0  )  0.0 +  1.0*X                   LINEAR

CONDITIONING VARIABLE ID:  SCHL0191
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLU12M (M          ) 0                               MISSING
002 NATLUN12 (@          ) 1                               PERCENT

CONDITIONING VARIABLE ID:  SCHL0192
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN THE NATIONAL SCHOOL LUNCH PROGRAM
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   NTLUNGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 NATLU12L (0-100,M=0  )  0.0 +  1.0*X                   LINEAR

CONDITIONING VARIABLE ID:  SCHL0193
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMRD12M (M          ) 0                               MISSING
002 REMRD12  (@          ) 1                               PERCENT

CONDITIONING VARIABLE ID:  SCHL0194
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL READING
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMRDGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMRD12L (0-100,M=0  )  0.0 +  1.0*X                   LINEAR

CONDITIONING VARIABLE ID:  SCHL0195
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    2
TYPE OF CONTRAST:          CLASS                           NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMH12M (M          ) 0                               MISSING
002 REMMH12  (@          ) 1                               PERCENT

CONDITIONING VARIABLE ID:  SCHL0196
DESCRIPTION:               PERCENT OF STUDENTS IN 12TH WHO PARTICIPATED IN REMEDIAL MATH
GRADES/ASSESSMENTS:        N12
CONDITIONING VAR LABEL:
NAEP ID:                   REMMHGR                         TOTAL NUMBER OF SPECIFIED CONTRASTS:    1
TYPE OF CONTRAST:          LINEAR                          NUMBER OF INDEPENDENT CONTRASTS:        1

001 REMMH12L (0-100,M=0  )  0.0 +  1.0*X                   LINEAR
```

Table C-6

Conditioning Variables for the Long-Term Trend Reading Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Overall	All		—	1
Gender	All	DSEX	Male	0
			Female	1
Region	All	REGION	Northeast	000
			Southeast	100
			Central	010
			West	001
Parental Education	All	PARED	Less than high school	0000
			High school graduate	1000
			Post-high school	0100
			College graduate	0010
			Missing and I don't know	0001
Items in the Home	All	B000901	None of the six items	00
		B000902	One of the six items	10
		B000903	Two of the six items	20
		B000904	Three of the six items	30
		B000905	Four of the six items	40
		B000906	Five of the six items	50
			Six of the six items	60
			Missing	01
Television Watching	All	B001801	None	00
			One hour or less	10
			Two hours	20
			Three hours	30
			Four hours	40
			Five hours	50
			Six or more hours	60
			Missing	01
Homework	All	B001701	Don't have any	00
			Don't do any	00
			Less than 1 hour	10
			1-2 hours	20
			More than 2 hours	30
			Missing	01
Language Spoken at Home	All	B000401	English	00
			Spanish	10
			Other	10
			Missing	01

Table C-6 (continued)

Conditioning Variables for the Long-Term Trend Reading Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Pages Read	All	B001101	More than 20	10
			16-20	10
			11-15	10
			6-10	10
			5 or fewer	00
			Missing	01
Percent in School Lunch Program	All	C032001	None	00000000
			1-5%	10000000
			6-10%	01000000
			11-25%	00100000
			26-50%	00010000
			51-75%	00001000
			76-90%	00000100
			over 90%	00000010
			Missing	00000001
Percent White	All	PCTWHTQ	0-49%	100
			50-79%	010
			80-100%	001
			Missing	000
Derived Race/Ethnicity	All	DRACE	White	000
			Black	100
			Hispanic	010
			Asian American	001
			American Indian	000
			Unclassified	000
			Missing	000
Age by Grade	All	MODGRAG	< age, = grade	0000
			= age, < grade	1000
			= age, = grade	0100
			= age, > grade	0010
			> age, = grade	0001
School Type	All	SCHTYPE	Public	1
			Private, Catholic, Bureau of Indian Affairs, Department of Defense	0
Description of Community	All	DOC	Big City	0000
			Fringe	1000
			Medium City	0100
			Small Place	0010
			Missing	0001

Table C-6 (continued)

Conditioning Variables for the Long-Term Trend Reading Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Type of Location	All	TOL8	Big City	00000000
			Medium City	10000000
			Fringe of Big City	01000000
			Fringe of Medium City	00100000
			Large Town	00010000
			Small Place	00001000
			Rural - MSA	00000100
			Rural - Non MSA	00000010
			Missing	00000001
Courses Taken	9, 13	B001001	None	00
		B001002	1	10
		B001003	2	20
		B001004	3	30
		B001005	4	40
		B001006	5	50
		B001007	6	60
			7	70
			Missing	01

Table C-7

Conditioning Variables for the Long-Term Trend Mathematics Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Overall	All		—	1
Gender	All	GENDER	Male	0
			Female	1
Observed Race/Ethnicity	All	ETHNIC	White	000
			Black	100
			Hispanic	010
			Asian American	001
			American Indian	000
			Other	000
			Missing	000
Size and Type of Community	All	STOC	1, 4-7 all except 2 and 3	01
			2 Low Metro	00
			3 High Metro	10
Region	All	REGION	Northeast	000
			Southeast	100
			Central	010
			West	001
Parents' Education	All	PARED	Less than high school	0000
			High school graduate	1000
			Post-high school	0100
			College graduate	0010
			Missing and I Don't Know	0001
Modal Grade	All	MODGRD	< modal grade	10
			= modal grade, missing	00
			> modal grade	01
Items in the Home (of newspaper, > 25 books, encyclopedia, magazines)	All	HOMEEN2	0 to 2 items	00
			3 items	10
			4 items	01

Table C-7 (continued)

Conditioning Variables for the Long-Term Trend Mathematics Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Observed Race/Ethnicity by Gender ("White" includes American Indian and Other)	All	RACE x GENDER	White, male	000
			Black, male	000
			Hispanic, male	000
			Asian American, male	000
			White, female	000
			Black, female	100
			Hispanic, female	010
			Asian American, female	001
Observed Race/Ethnicity by Parents' Education ("White" includes American Indian and Other)—coded differently for each age class	9	RACE x PARED	White, < HS	0000 0000 0000
			White, HS graduate	0000 0000 0000
			White, post-HS	0000 0000 0000
			White, college grad.	0000 0000 0000
			White, missing	0000 0000 0000
			Black, < HS	0000 0000 0000
			Black, HS grad & post-HS	1000 0000 0000
			Black, college grad.	0010 0000 0000
			Black, missing	0001 0000 0000
			Hispanic, < HS	0000 0000 0000
			Hispanic, HS grad & post-HS	0000 1000 0000
			Hispanic, coll. grad.	0000 0010 0000
			Hispanic, missing	0000 0001 0000
			Asian Amer., < HS	0000 0000 0000
			Asian Amer., HS grad & post-HS	0000 0000 1000
			Asian Amer., coll. grad.	0000 0000 0010
			Asian Amer., missing	0000 0000 0001

Table C-7 (continued)

Conditioning Variables for the Long-Term Trend Mathematics Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Observed Race/Ethnicity by Parents' Education ("White" includes American Indian and Other)—coded differently for each age class	13	RACE x PARED	White, < HS	0000 0000 0000
			White, HS graduate	0000 0000 0000
			White, post-HS	0000 0000 0000
			White, college grad.	0000 0000 0000
			White, missing	0000 0000 0000
			Black, < HS	0000 0000 0000
			Black, HS graduate	1000 0000 0000
			Black, post-HS	0100 0000 0000
			Black, college grad.	0010 0000 0000
			Black, missing	0001 0000 0000
			Hispanic, < HS	0000 0000 0000
			Hispanic, HS grad.	0000 1000 0000
			Hispanic, post-HS	0000 0100 0000
			Hispanic, coll. grad.	0000 0010 0000
			Hispanic, missing	0000 0001 0000
			Asian Amer., < HS	0000 0000 0000
			Asian Amer., HS grad.	0000 0000 1000
			Asian Amer., post-HS	0000 0000 0100
			Asian Amer., coll. grad.	0000 0000 0010
			Asian Amer., missing	0000 0000 0001
Observed Race/Ethnicity by Parents' Education ("White" includes American Indian and Other)—coded differently for each age class	17	RACE x PARED	White, < HS	0000 0000 0000
			White, HS graduate	0000 0000 0000
			White, post-HS	0000 0000 0000
			White, college grad.	0000 0000 0000
			White, missing	0000 0000 0000
			Black, < HS	0000 0000 0000
			Black, HS graduate	1000 0000 0000
			Black, post-HS	0100 0000 0000
			Black, college grad.	0010 0000 0000
			Black, missing	0001 0000 0000
			Hispanic, < HS	0000 0000 0000
			Hispanic, HS grad.	0000 1000 0000
			Hispanic, post-HS	0000 0100 0000
			Hispanic, coll. grad.	0000 0010 0000
			Hispanic, missing	0000 0001 0000
			Asian Amer., < HS	0000 0000 0000
			Asian Amer., HS grad.	0000 0000 1000
			Asian Amer., post-HS, coll. grad.	0000 0000 0100
			Asian Amer., missing	0000 0000 0001
Language in the Home	All	LANGHOM	Never	00
			Sometimes	10
			Always	01
Observed Race by	All	RACE x	White, often	00 00 00

Table C-7 (continued)

Conditioning Variables for the Long-Term Trend Mathematics Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Language at Home		LANGHOM	White, sometimes	00 00 00
			White, never	00 00 00
			Black, often and sometimes	10 00 00
			Black, often	10 00 00
			Black, sometimes	01 00 00
			Black, never	00 00 00
			Hispanic, often and sometimes	00 10 00
			Hispanic, often	00 10 00
			Hispanic, sometimes	00 01 00
			Hispanic, never	00 00 00
			Asian American, often and sometimes	00 00 10
			Asian American, often	00 00 10
			Asian American, sometimes	00 00 01
			Asian American, never	00 00 00
Derived Race/Ethnicity	All	DRACE	White	000
			Black	100
			Hispanic	010
			Asian American	001
			Other	000
			Missing	000
Homework	13, 17	HW	None assigned	100
			Didn't do	010
			1/2 hour or less	012
			1 hour	013
			2 hours	014
			More than 2 hours	000
			Missing	000
Highest Level of Mathematics Class	17	NMATH	Pre-Algebra	10000
			Algebra	01000
			Geometry	00100
			Algebra 2	00010
			Calculus	00001
			Something else	00000
High School Program	17	HS_PGM	General	00
			College Preparatory	10
			Vocational/Technical	01
			Missing	00

Table C-7 (continued)

Conditioning Variables for the Long-Term Trend Mathematics Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Type of Location	All	TOL8	Big City	00000000
			Medium City	10000000
			Fringe of Big City	01000000
			Fringe of Medium City	00100000
			Large Town	00010000
			Small Place	00001000
			Rural - MSA	00000100
			Rural - non MSA	00000010
			Missing	00000001

Table C-8

Conditioning Variables for the Long-Term Trend Science Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Overall	All		—	1
Gender	All	DSEX	Male	0
			Female	1
Observed Race	All	RACE	White	000
			Black	100
			Hispanic	010
			Asian American	001
			American Indian, Pacific Islander	000
			Other, blank, missing	000
Size and Type of Community (92 only)	All	STOC	Low Metro	10
			High Metro	01
			All others, missing	00
Type of Location (94 and 96 only)	All	TOL8	Big City	00000000
			Medium City	10000000
			Fringe of Big City	01000000
			Fringe of Medium City	00100000
			Large Town	00010000
			Small Place	00001000
			Rural - MSA	00000100
			Rural - Non MSA	00000010
			Missing	00000001
Region	All	REGION	Northeast	000
			Southeast	100
			Central	010
			West	001
			Missing	000
Parents' Education	All	PARED	Less than high school	0000
			High school graduate	1000
			Post-high school	0100
			College graduate	0010
			Missing and I don't know	0001
Modal Grade	All	MODGRD	< modal grade	10
			= modal grade	00
			> modal grade	01
			Missing	00

Table C-8 (continued)

Conditioning Variables for the Long-Term Trend Science Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Observed Race by Gender	All	RACE x DSEX	White, Male	000
			Black, Male	000
			Hispanic, Male	000
			Asian American, Male	000
			White, Female	000
			Black, Female	100
			Hispanic, Female	010
			Asian American, Female	001
			Other combinations, missing	000
Observed Race by Parents' Education	All	RACE x PARED	White, < High school	000000000000
			White, = High school	000000000000
			White, > High school	000000000000
			White, Graduated college	000000000000
			White, missing or unknown	000000000000
			Black, < High school	000000000000
			Black, = High school	100000000000
			Black, > High school	010000000000
			Black, Graduated college	001000000000
			Black, missing or unknown	000100000000
			Hispanic, < High school	000000000000
			Hispanic, = High school	000010000000
			Hispanic, > High school	000001000000
			Hispanic, Graduated college	000000100000
			Hispanic, missing or unknown	000000010000
			Asian American, < High school	000000000000
			Asian American, = High school	000000001000
			Asian American, > High school	000000000100
			Asian American, Graduated college	000000000010
			Asian American, missing or unknown	000000000001
School Type	All	SCHTYPE	Public	0
			Private, Catholic, BIA, DoDEA	1
			Missing	0
Items in the Home	All	HOMEEN2	0-2 items	00
			3 items	10
			4 items	01
			Missing	00

Table C-8 (continued)

Conditioning Variables for the Long-Term Trend Science Assessment in 1996

Conditioning Variable	Age Classes	Variable Name(s)	Variable Coding	Contrast Coding
Derived Race	All	DRACE	White	000
			Black	100
			Hispanic	010
			Asian American	001
			American Indian, Pacific Islander	000
			Other, missing	000
Language Spoken in the Home (Other than English)	All	LANGHOM	Never	00
			Sometimes	10
			Always	01
			Missing	00
Observed Race by Language in the Home	All	RACE x LANGHOM	White, Always	000000
			White, Sometimes	000000
			White, Never	000000
			Black, Always	100000
			Black, Sometimes	010000
			Black, Never	000000
			Hispanic, Always	001000
			Hispanic, Sometimes	000100
			Hispanic, Never	000000
			Asian American, Always	000010
			Asian American, Sometimes	000001
			Asian American, Never	000000
			One or both missing	000000
Homework	13, 17	B001701	None assigned	100
			Didn't do	010
			1/2 hour or less	012
			One hour	013
			Two hours	014
			More than two hours	000
			Missing	000
Highest Level of Science Class	17	B005308 B005309 B005310 B005311	General Science	1000
			Biology	0100
			Chemistry	0010
			Physics	0001
			Nothing, Something Else	0000
			Missing	0000
High School Program	17	B005001	General	00
			College Preparatory	10
			Vocational, technical	01
			Missing	00

Table C-9

Conditioning Variables for the Long-Term Trend Writing Assessment in 1996

Conditioning Variable	Variable	Number of Contrasts	Contrasts	Contrasts Codes
Intercept		1	Overall	1
Gender	DSEX	1	Male	0
			Female	1
Race/Ethnicity	Ethnic(84) DRACE (88,90,92,94,96)	2	Black	00
			Hispanic	01
			White+others	10
Type of Community/ Location	STOC (84,88,90,92)	2	STOC:	
			Low Metro	00
			Everyone else	01
			Hi Metro	10
	TOL8(94,96)	7	TOL8:	
			Large City & miss	0000000
			Medium City	1000000
			Urb. Fring of LC	0100000
			Urb. Fring of MC	0010000
			Big Town	0001000
			Small Town	0000100
			Rural-MSA	0000010
			Rural-non-MSA	0000001
Region	REGION	3	Northeast	000
			Southeast	100
			Central	010
			West	001
Parent's Education	PARED	4	Less than H.S.	0000
			High School	1000
			Greater HS	0100
			College	0010
			I don't know	0001
Items in the home	B000901, B000902, B000903, B000904 B000905	2	Articles in home:	
			0-3 or missing	00
			4	10
			5	01
Modal age	DAGE	2	Modal Age	00
			< Modal age	10
			> Modal age	01

Table C-9 (continued)

Conditioning Variables for the Long-Term Trend Writing Assessment in 1996

Conditioning Variable	Variable	Number of Contrasts	Contrasts	Contrasts Codes
Homework	B001701	5	None assigned	00000
			None done	10000
			< 1 hr	01000
			1-2 hrs	00100
			2+ hrs	00010
			Missing HW	00001
School type	SCHTYPE	2	Public School	0
			Non-Public	1
			Missing	1
TV watching, Linear	B001801	1	None	0
			1 hour	1
			2 hours	2
			3 hours	3
			Missing	3
			4 hours	4
			5 hours	5
			6 hours	6
TV watching, Quadratic	B001801	2	None	00
			1 hour	01
			2 hours	04
			3 hours	09
			Missing	09
			4 hours	16
			5 hours	25
			6 hours	36
Mother Work Outside the Home	B000801	1	Mother does not work Missing	0
			Mother works	0
				1
Language Minority (self speaking at home)	B000301	2	Not language minority	00
			Language minority	10
			Missing	01
Percent in Lunch Program	C001301(84)	7	None in lunch program	0000000
	PCLUNCH (88,90)		1-5%	1000000
	C0320101(92,94,96)		6-10%	0100000
			11-25%	0010000
			26-50%	0001000
			51-75%	0000100
			76-90%	0000010
			over 90%	0000001
Minority School	PCTWHT	2	Minority (0-49.9%)	00

Table C-9 (continued)

Conditioning Variables for the Long-Term Trend Writing Assessment in 1996

Conditioning Variable	Variable	Number of Contrasts	Contrasts	Contrasts Codes
	PCTWHTQ		Intergrated (50- 79.9%)	10
			White or Missing (80-100%)	01
Grades in School	B001901	1 Var	Grade (Missing included at 2.0)	0.0-4.0
Pages Read for HW	B001101	3	No pages read	000
			11+ pages read	100
			6-10 pages read	010
			5 or less pages read	001
Number of reports	B001201-7 and B001208	1	Number of reports, essays etc.	0-7

Table C-10

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.92422	STGRD3>	0.88466	T/P 32	0.79005
BLACK	0.93928	SNRM-LIN	0.88196	T/P 33	0.79097
HISPANIC	0.96987	SCHCHG-1	0.91473	T/P 34	0.78458
ASIAN	0.94278	SCHCHG-2	0.91001	T/P 35	0.80476
MEXICAN	0.95600	SCHCHG-3	0.81984	T/P 41	0.76880
PUER RIC	0.92864	DIS@HOM2	0.89416	T/P 42	0.74497
CUBN,OTH	0.96742	DIS@HOM3	0.93408	T/P 43	0.77272
HISP-?	0.74847	DIS@HOM4	0.79632	T/P 44	0.80053
NON MSA	0.92046	PGS>5	0.82911	T/P 45	0.83715
MID CTY5	0.94280	PGS>10	0.83882	T/P 51	0.83797
FR/BTWN5	0.94911	G/R 22	0.91016	T/P 52	0.77254
SML TWN5	0.95067	G/R 23	0.90786	T/P 53	0.81563
RURAL5	0.95097	G/R 24	0.95898	T/P 54	0.79556
URBAN FR	0.90811	G/T 22	0.71798	T/P 55	0.79026
MED CITY	0.89044	G/T 23	0.73468	T/S 32	0.95336
SM PLACE	0.93298	G/T 24	0.77888	T/S 33	0.93082
HS GRAD	0.94671	G/T 25	0.73060	T/S 41	0.93927
POST HS	0.92986	G/P 22	0.92747	T/S 42	0.93128
COL GRAD	0.92976	G/P 23	0.89300	T/S 43	0.96264
PARED-?	0.94023	G/P 24	0.85988	T/S 51	0.94403
S EAST	0.89683	G/P 25	0.84783	T/S 52	0.94797
CENTRAL	0.89537	G/S 22	0.93396	P/S 32	0.96888
WEST	0.90228	G/S 23	0.89897	P/S 33	0.94519
PRIVATE	0.93637	R/T 24	0.89235	P/S 41	0.95888
CATHOLIC	0.91800	R/T 25	0.90331	P/S 42	0.93031
IEP-NO	0.87421	R/T 31	0.90034	P/S 43	0.95356
LEP-NO	0.79025	R/T 32	0.89554	P/S 51	0.92917
CHAP1-N	0.77000	R/T 33	0.88687	P/S 52	0.95848
RED PRIC	0.93333	R/T 34	0.88052	P/S 53	0.93447
FREE	0.73534	R/T 35	0.85371	SAMP S2	0.87473
INFO N/A	0.85427	R/T 41	0.88419	/R 23	0.90811
SCH/REF	0.84591	R/T 42	0.92435	/R 24	0.90508
HL-SOME	0.85950	R/T 43	0.93164	/R 31	0.96289
HL-ALWAY	0.85486	R/T 44	0.93998	B009301B	0.95836
HL-?	0.80373	R/T 45	0.94866	B009301C	0.96313
B008901N	0.95242	R/P 24	0.89509	B009301D	0.96067
B008901M	0.70149	R/P 25	0.87983	B009301E	0.94948
TVLIN-0	0.98291	R/P 31	0.90064	B009301M	0.92458
TV-QUAD	0.98263	R/P 32	0.91138	B009401B	0.94274
HW-NO	0.96512	R/P 33	0.89862	B009401C	0.94860
HW-YES	0.96865	R/P 34	0.90463	B009401D	0.90675
HWLIN-0	0.97548	R/P 35	0.89655	B009401M	0.91517
HWQUAD-0	0.96240	R/P 41	0.89841	B009501B	0.95808
HITEM=3	0.86215	R/P 42	0.96949	B009501C	0.84231
HITEM=4	0.82846	R/P 43	0.96354	B009501M	0.89573
MOMHOM-N	0.81244	R/P 44	0.96174	B009502B	0.95167
MOMHOM-?	0.88256	R/P 45	0.96426	B009502C	0.86065
DADHOM-N	0.86602	R/S 31	0.97978	B009502M	0.87799
DADHOM-?	0.92245	R/S 32	0.96311	M812701B	0.87446
MISS-2<	0.93929	R/S 33	0.97170	M812701C	0.92214
USA >5	0.93754	R/S 41	0.95920	M812701D	0.84959
USA 3-5	0.92960	R/S 42	0.96764	M812701M	0.75474
USA <3	0.92448	R/S 43	0.96940	M812702B	0.87726
USA-?	0.83469	T/P 25	0.81392	M812702C	0.90130
STGRD1-2	0.90017	T/P 31	0.82723	M812701D	0.87129

Table C-10 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
M812701M		M812101F	0.97657	C031212B	0.89289
0.77048		M812101G	0.95779	C031212M	0.97017
M812703B	0.94466	M812101M	0.77945	C031205B	0.90185
M812703C	0.95361	M811401N	0.83560	C031205C	0.89277
M812703D	0.93975	M811401M	0.81227	C031205M	0.93941
M812703M	0.71661	M811101B	0.90471	C031213M	0.95475
M812704B	0.93276	M811101C	0.85283	C031214B	0.90767
M812704C	0.93105	M811101M	0.84889	C031214C	0.92306
M812704D	0.92633	M811103B	0.90634	C031214D	0.90531
M812704M	0.72479	M811103C	0.85451	C031214E	0.90683
M812705B	0.92230	M811103M	0.84217	C031214M	0.92600
M812705C	0.92740	M811106B	0.91234	C031603N	0.87846
M812705D	0.90764	M811106C	0.90506	C031603M	0.92434
M812705M	0.76198	M811106M	0.75855	C031607N	0.89303
M812706B	0.92303	M811109B	0.87823	C031607M	0.94545
M812706C	0.93229	M811109C	0.85178	C031601N	0.88729
M812706D	0.93410	M811109M	0.85089	C031601M	0.94662
M812706M	0.72774	M811107B	0.83958	C031610N	0.90678
M812707B	0.91670	M811107C	0.81346	C031610M	0.95321
M812707C	0.93858	M811107M	0.85408	C031606N	0.88964
M812707D	0.88953	M811105B	0.94083	C031606M	0.94862
M812707M	0.89200	M811105C	0.92457	C035701N	0.88805
M812708B	0.88593	M811105M	0.85277	C035701M	0.93004
M812708C	0.89736	M811108B	0.90576	C035702N	0.89130
M812708D	0.87920	M811108C	0.88138	C035702M	0.92471
M812708M	0.68806	M811108M	0.88722	C035703N	0.88402
M812709B	0.91900	M811110B	0.93917	C035703M	0.92740
M812709C	0.92927	M811110C	0.94704	C037201M	0.94474
M812709D	0.90477	M811110M	0.87218	C037202M	0.92251
M812709M	0.72509	MM00101B	0.84889	C037207M	0.91288
M812710B	0.92641	MM00101C	0.86647	C037204M	0.90320
M812710C	0.94339	MM00101D	0.90934	C037205M	0.90800
M812710D	0.90871	MM00101M	0.88111	C037206M	0.93973
M812710M	0.84702	MM00201B	0.90505	C037301M	0.97484
M812711B	0.93730	MM00201C	0.90559	C037302M	0.96190
M812711C	0.95239	MM00201D	0.90476	C037303M	0.96240
M812711D	0.92672	MM00201M	0.91399	C037304M	0.89266
M812711M	0.84435	MM00301B	0.88918	C037305M	0.92732
M811201N	0.85363	MM00301C	0.85485	C037401M	0.89938
M811201M	0.84968	MM00301D	0.90776	C037402M	0.89873
M812001B	0.91257	MM00301M	0.84424	C037403M	0.88274
M812001C	0.93958	MM00401B	0.92763	C037404M	0.88499
M812001D	0.89292	MM00401C	0.94108	C037405M	0.88798
M812001M	0.78811	MM00401D	0.94031	C037406M	0.87276
M812002B	0.93992	MM00401M	0.90467	C037501M	0.87432
M812001C	0.94042	MM00501B	0.88779	C037502M	0.88889
M812001D	0.89765	MM00501C	0.89769	C037503M	0.88022
M812001M	0.81152	MM00501D	0.91306	C037504M	0.89411
M812003B	0.93589	MM00501M	0.80670	C037505M	0.91016
M812003C	0.95728	C030901B	0.87546	C037601M	0.91900
M812003D	0.93863	C030901C	0.89822	C037602M	0.90388
M812003M	0.87599	C030901M	0.97693	C037603M	0.93754
M812101B	0.95122	C037101B	0.89290	C037604M	0.89697
M812101C	0.98021	C037101C	0.90595	C037605M	0.92835
M812101D	0.98464	C037101N	0.94737	C036601B	0.90340
M812101E	0.98150	C037101M	0.93370	C036601C	0.94582

Table C-10 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C036601D	0.96106	C032411C	0.92916	T056001C	0.85497
C036601M	0.93323	C032411D	0.95921	T056001D	0.88643
C032207B	0.90906	C032412C	0.90880	T056001E	0.89026
C032207N	0.88328	C032413B	0.87343	T056001F	0.90057
C032207M	0.92796	C032413C	0.89923	T056001M	0.93437
C032209B	0.88240	C032414B	0.91543	T040301B	0.90023
C032209N	0.91232	C032414C	0.95362	T040301C	0.91623
C032209M	0.97717	C032414D	0.93445	T040301D	0.92629
C032210B	0.89290	C032415B	0.91543	T040301E	0.93485
C032210N	0.89959	C032415C	0.88831	T040301M	0.97112
C032210M	0.94318	C032502B	0.90525	T056101B	0.91949
C032211B	0.89806	C032502C	0.91341	T056101C	0.92407
C032211N	0.87633	C032502D	0.91998	T056101D	0.93806
C032211M	0.97839	C032503B	0.89030	T056101E	0.94465
C037701B	0.88757	C032503C	0.90449	T056101M	0.97687
C037701C	0.89656	C032505B	0.89514	T056102B	0.88880
C037701D	0.90758	C032505C	0.91082	T056102C	0.89683
C037701M	0.98981	C032505D	0.90382	T056102D	0.91719
C037702B	0.90859	C032506B	0.88183	T056102E	0.92978
C037702C	0.93760	C032506C	0.89775	T056102M	0.90207
C037702D	0.94255	C032506D	0.94373	T056201B	0.87996
C037703B	0.91776	C033601B	0.88746	T056201C	0.87424
C037703C	0.92911	C033601C	0.91444	T056201D	0.90152
C037703D	0.95420	C033601M	0.96982	T056201E	0.89091
C037704B	0.89812	C036501B	0.88549	T056201F	0.86307
C037704C	0.88562	C036501C	0.88945	T056201M	0.89431
C037704D	0.87868	C037801B	0.91251	T040501N	0.86646
C037704M	0.94449	C037801C	0.91425	T040501C	0.87847
C037705B	0.90509	C037801D	0.91956	T040501M	0.88168
C037705C	0.89905	C037801E	0.89582	T040506N	0.91930
C037705D	0.89193	C037801F	0.88578	T040506C	0.93518
C037705M	0.98275	C037801G	0.89624	T040506M	0.92416
C032402B	0.91690	C037801H	0.87801	T040504N	0.92875
C032402C	0.93603	C037801M	0.93805	T040504C	0.91604
C032402D	0.93000	C037901B	0.90039	T040504M	0.93770
C032402M	0.95263	C037901C	0.88338	T040507N	0.92414
C032401B	0.92205	C037901E	0.89721	T040507C	0.93028
C032401C	0.94109	C038001B	0.88267	T040507M	0.93216
C032401D	0.94183	C038001C	0.89724	T040508N	0.92610
C032401M	0.96538	C038001D	0.90367	T040508C	0.92511
C032404B	0.91540	C038001F	0.91884	T040508M	0.95049
C032404C	0.94872	C038001G	0.89475	T040505N	0.87425
C032404D	0.93668	C038301N	0.87255	T040505C	0.85036
C032404M	0.97495	C038801N	0.90074	T040505M	0.88310
C032406B	0.89929	C034101M	0.90931	T056301B	0.86863
C032406C	0.89908	C034102M	0.86390	T056301C	0.94542
C032407B	0.93072	C034103M	0.90034	T056301D	0.94757
C032407C	0.90227	C034104M	0.91039	T056301E	0.87991
C032408B	0.92336	C034105M	0.88246	T056301F	0.89665
C032408C	0.93971	C034106M	0.87927	T056301G	0.92785
C032408D	0.94243	C034107M	0.89607	T040701M	0.85850
C032409B	0.90573	C034108M	0.88519	T040706M	0.87270
C032409C	0.94692	C034109M	0.90284	T040707M	0.88064
C032409D	0.93129	T055901B	0.83449	T040703M	0.85761
C032410B	0.90989	T055901M	0.95592	T040704M	0.89422
C032410C	0.91409	T056001B	0.85919	T040710M	0.86605

Table C-10 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T040711M	0.88088	T058201E	0.85271	T0569C7M	0.91690
T040712M	0.88793	T058201M	0.93699	T056908M	0.88151
T040713M	0.89131	T056701M	0.84442	T0569A8M	0.87210
T040708M	0.86839	T056702M	0.86785	T0569B8M	0.87636
T040709M	0.88842	T056703M	0.84733	T0569C8M	0.90877
T040705M	0.86609	T056704M	0.84667	T057001N	0.86053
T040801M	0.86782	T056705M	0.86584	T057001M	0.90995
T040807M	0.88407	T056706M	0.88206	T057002N	0.86184
T040808M	0.87263	T056707M	0.84208	T057002M	0.93314
T040803M	0.85837	T056708M	0.86398	T057003N	0.84736
T040804M	0.87242	T056709M	0.86342	T057003M	0.93251
T040814M	0.86338	T056710M	0.85226	T057004N	0.84355
T040815M	0.89963	T056711M	0.84552	T057004M	0.92756
T040816M	0.90897	T056712M	0.86144	T057005N	0.83569
T040817M	0.90343	T056713M	0.85136	T057005M	0.93750
T040809M	0.85225	T041201B	0.91372	T057006N	0.85345
T040810M	0.88623	T041201C	0.91852	T057006M	0.92040
T040811M	0.86569	T041201D	0.87742	T057007N	0.86267
T040812M	0.86161	T041201M	0.97165	T057007M	0.91579
T040813M	0.87130	T041302N	0.92005	T057101B	0.88236
T040805M	0.87488	T041302M	0.90450	T057101C	0.92509
T040806M	0.87139	T041303N	0.91591	T057101D	0.93133
T056401M	0.87217	T041303M	0.89679	T057101M	0.92361
T056402M	0.88232	T056801B	0.88290	T057201M	0.87624
T056403M	0.86561	T056801C	0.91737	T057211M	0.85779
T056404M	0.86030	T056801D	0.93092	T057221M	0.87096
T056405M	0.85499	T056801E	0.90584	T057231M	0.87670
T056413M	0.84907	T056801F	0.91298	T057241M	0.91534
T056414M	0.87428	T056801M	0.92515	T057301B	0.87060
T056415M	0.88588	T056901M	0.87090	T057301C	0.87623
T056416M	0.88361	T0569A1M	0.88752	T057301M	0.95025
T056406M	0.84066	T0569B1M	0.84911	T057302B	0.87815
T056407M	0.87904	T0569C1M	0.87488	T057302M	0.95258
T056408M	0.86924	T056902M	0.90372	T057303B	0.87830
T056409M	0.85604	T0569A2M	0.90806	T057303C	0.90424
T056410M	0.87048	T0569B2M	0.86996	T057303M	0.95719
T056411M	0.88352	T0569C2M	0.88831	T057304B	0.84929
T056412M	0.88974	T056903M	0.88404	T057304C	0.86139
T056501B	0.91310	T0569A3M	0.90967	T057304M	0.92002
T056501C	0.91126	T0569B3M	0.90105	T057401B	0.90239
T056501D	0.89844	T0569C3M	0.87855	T057401C	0.91147
T056501E	0.87955	T056904M	0.88116	T057401D	0.91456
T056501M	0.94460	T0569A4M	0.89535	T057401M	0.94497
T058101B	0.87513	T0569B4M	0.88101	T057402B	0.87718
T058101C	0.88453	T0569C4M	0.89052	T057402C	0.86257
T058101D	0.88429	T056905M	0.88390	T057402D	0.86972
T058101E	0.85574	T0569A5M	0.89367	T057402M	0.87157
T058101M	0.94762	T0569B5M	0.86742	T057403B	0.89626
T056601B	0.88151	T0569C5M	0.88765	T057403C	0.90086
T056601C	0.87588	T056906M	0.91177	T057403D	0.87718
T056601D	0.89212	T0569A6M	0.89529	T057403M	0.95064
T056601E	0.87477	T0569B6M	0.86272	T057404B	0.89499
T056601M	0.95900	T0569C6M	0.91056	T057404C	0.90763
T058201B	0.88402	T056907M	0.90241	T057404D	0.89079
T058201C	0.87801	T0569A7M	0.89949	T057404M	0.96581
T058201D	0.86875	T0569B7M	0.88021	T057405B	0.90667

Table C-10 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance
T057405C	0.88626
T057405D	0.89650
T057405M	0.96396
T057501B	0.90647
T057501C	0.90728
T057501D	0.88542
T057501E	0.90756
T057501F	0.88592
T057501M	0.88922
T057601B	0.90068
T057601C	0.87531
T057601D	0.87089
T057601E	0.88152
T057601M	0.88177
T044002N	0.96057
T044002M	0.98118
T057701B	0.88013
T057701C	0.93030
T057701D	0.90493
T057701M	0.93232
T057801B	0.89626
T057801C	0.90313
T057801D	0.88796
T057801E	0.88363
T057801M	0.92501
T044201N	0.84915
T044201M	0.95404
T044301B	0.92323
T044301C	0.92658
T044301M	0.94428
T057901B	0.89811
T057901C	0.92830
T057901D	0.92205
T057901M	0.95806
T044401B	0.93553
T044401C	0.93908
T044401D	0.85349
T044401E	0.84742
T044401F	0.86032
T044401M	0.94802
T044501B	0.86534
T044501C	0.87699
T044501D	0.88415
T044501M	0.98882
T044502B	0.88635
T044502C	0.88693
T044502D	0.87010
T044502M	0.98776
T044512B	0.89116
T044512C	0.90369
T044512D	0.86574
T044513B	0.90891
T044513C	0.91592
T044513D	0.87999
T044513M	0.98443
T044514B	0.88894
T044514C	0.93670
T044514D	0.91131
T044514M	0.94879
T044505B	0.90978
T044505C	0.93496
T044505D	0.90303
T044505M	0.96128
T044515B	0.94914
T044515C	0.95660
T044515D	0.87350
T044515M	0.97925
T044507B	0.90786
T044507C	0.90997
T044507D	0.90189
T044507M	0.94931
T044516B	0.86404
T044516C	0.87541
T044516D	0.86403
T044516M	0.97424
T044508B	0.87910
T044508C	0.94909
T044508D	0.94682
T044508M	0.97046
T044509B	0.88251
T044509C	0.87048
T044509D	0.87755
T044509M	0.98858
T044510B	0.88589
T044510C	0.89079
T044510D	0.87292
T044510M	0.97816
T044506B	0.91074
T044506C	0.91055
T044506D	0.89806
T044506M	0.98601
T058001B	0.87914
T058001C	0.94285
T058001D	0.86668
T058001M	0.98340
T058002B	0.86930
T058002C	0.90760
T058002D	0.88591
T058002M	0.98362
T058003B	0.89322
T058003C	0.90914
T058003D	0.87573
T058003M	0.96909
T058004B	0.91433
T058004C	0.91976
T058004D	0.89295
T058004M	0.94642
T058005B	0.91308
T058005C	0.92420
T058005D	0.90207
T058005M	0.96135
T058006B	0.87168
T058006C	0.87947
T058007B	0.84998
T058007C	0.89035
T058008B	0.86926
T058008C	0.87852
T058008D	0.88313
T058009B	0.87471
T058009C	0.88656
T058009D	0.86106
T058009M	0.97804
T045401N	0.84916
T045401M	0.97164
T044801N	0.85058
T044801M	0.94684
T045001N	0.85883
T045001M	0.97507
T044901N	0.87216
T044901M	0.95233
T045304B	0.89609
T045304C	0.90295
T045304M	0.99250
T045305B	0.90586
T045305C	0.91145
T045305M	0.98072
T045302B	0.90421
T045302C	0.90917
T045302D	0.88258
T045303B	0.89142
T045303C	0.87448
T045303D	0.87792
T045303M	0.98069
T044000B	0.88559
T044000C	0.90168
T044000D	0.88654
T044000E	0.86796
T044000M	0.90723
NATLUNCH	0.88867
NATLUNCL	0.92919
REM READ	0.93790
REMREADL	0.93711
REM MATH	0.94580
REMMATHL	0.93332
NATLUN4	0.91489
NATLUN4L	0.92700
REMREAD4	0.93241
REMREA4L	0.91492
REMMATH4	0.93880
REMMAT4L	0.89187

Table C-11

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for

Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.94701	SCHCHG-2	0.92875	R/S 43	0.95780
BLACK	0.94977	SCHCHG-3	0.86997	T/P 25	0.80094
HISPANIC	0.97892	DIS@HOM2	0.89291	T/P 31	0.80134
ASIAN	0.94296	DIS@HOM3	0.91848	T/P 32	0.81521
MEXICAN	0.95099	DIS@HOM4	0.82593	T/P 33	0.84046
PUER RIC	0.93906	PGS>5	0.81303	T/P 34	0.78677
CUBN,OTH	0.95269	PGS>10	0.81267	T/P 35	0.79144
HISP-?	0.93864	8TH GRD	0.94151	T/P 41	0.78907
NON MSA	0.94366	PREALG	0.93329	T/P 42	0.84007
MID CTY5	0.95565	ALGEBRA	0.92511	T/P 43	0.78337
FR/BTWN5	0.96058	INT/SEQ	0.93387	T/P 44	0.76401
SML TWN5	0.96035	APPLIED	0.89124	T/P 45	0.81980
RURAL5	0.96816	OTHER	0.93801	T/P 51	0.78691
URBAN FR	0.92480	MISSING	0.93013	T/P 52	0.79266
MED CITY	0.89703	G/R 22	0.90755	T/P 53	0.80917
SM PLACE	0.94156	G/R 23	0.91042	T/P 54	0.82290
HS GRAD	0.96304	G/R 24	0.95593	T/P 55	0.84808
POST HS	0.95738	G/T 22	0.72733	T/S 32	0.93164
COL GRAD	0.95319	G/T 23	0.72892	T/S 33	0.92003
PARED-?	0.96129	G/T 24	0.74182	T/S 41	0.95479
S EAST	0.92396	G/T 25	0.74657	T/S 42	0.92872
CENTRAL	0.91036	G/P 22	0.88531	T/S 43	0.95063
WEST	0.91239	G/P 23	0.86071	T/S 52	0.95197
PRIVATE	0.93569	G/P 24	0.79421	P/S 32	0.95164
CATHOLIC	0.93388	G/P 25	0.81323	P/S 33	0.93344
IEP-NO	0.79397	G/S 22	0.93783	P/S 41	0.94493
LEP-NO	0.77834	G/S 23	0.91741	P/S 42	0.92261
CHAP1-N	0.78653	R/T 24	0.87374	P/S 43	0.93863
RED PRIC	0.89841	R/T 25	0.88210	P/S 51	0.92295
FREE	0.75139	R/T 31	0.89950	P/S 52	0.95461
INFO N/A	0.86504	R/T 32	0.92058	P/S 53	0.93576
SCH/REF	0.90436	R/T 33	0.87576	G/ 22	0.93592
HL-SOME	0.84902	R/T 34	0.87096	G/ 23	0.95116
HL-ALWAY	0.81695	R/T 35	0.87505	G/ 24	0.93179
HL-?	0.83754	R/T 41	0.90554	G/ 25	0.86323
B008901N	0.94253	R/T 42	0.92224	G/ 26	0.85715
B008901M	0.90926	R/T 43	0.91507	G/ 27	0.91950
TVLIN-0	0.98142	R/T 44	0.91470	G/ 28	0.84763
TV-QUAD	0.97999	R/T 45	0.95898	R/ 24	0.92793
HW-NO	0.96362	R/P 24	0.88729	R/ 25	0.91838
HW-YES	0.96561	R/P 25	0.89254	R/ 26	0.91243
HWLIN-0	0.93806	R/P 31	0.88749	R/ 27	0.89314
HWQUAD-0	0.91809	R/P 32	0.86224	R/ 28	0.89928
HITEM=3	0.89183	R/P 33	0.89687	R/ 31	0.87915
HITEM=4	0.86408	R/P 34	0.90150	R/ 32	0.86721
MOMHOM-N	0.84023	R/P 35	0.89567	R/ 33	0.92894
MOMHOM-?	0.87898	R/P 41	0.87712	R/ 34	0.92274
DADHOM-N	0.84817	R/P 42	0.95636	R/ 35	0.92208
DADHOM-?	0.88099	R/P 43	0.95964	R/ 36	0.90532
MISS-2<	0.91536	R/P 44	0.94623	R/ 37	0.90052
USA >5	0.91828	R/P 45	0.92191	R/ 38	0.88622
USA 3-5	0.92784	R/S 31	0.96606	R/ 41	0.87288
USA <3	0.87446	R/S 32	0.96618	R/ 42	0.95356
USA-?	0.79211	R/S 33	0.96676		
SNRM-LIN	0.89715	R/S 41	0.94469		
SCHCHG-1	0.92894	R/S 42	0.97132		

Table C-11 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
R/ 43	0.95586	T/ 53	0.83497	M812709B	0.88785
R/ 44	0.94588	T/ 54	0.84404	M812709C	0.90083
R/ 45	0.89045	T/ 55	0.87899	M812709D	0.86335
R/ 46	0.87926	T/ 57	0.81430	M812709M	0.74053
R/ 47	0.92260	S/ 23	0.95571	M812710B	0.93236
R/ 48	0.93993	S/ 24	0.94874	M812710C	0.93526
P/ 25	0.91725	S/ 25	0.93655	M812710D	0.91073
P/ 26	0.89966	S/ 26	0.87380	M812710M	0.79454
P/ 27	0.88288	S/ 27	0.88821	M812711B	0.86971
P/ 28	0.81238	S/ 28	0.94125	M812711C	0.89593
P/ 31	0.82703	S/ 31	0.88571	M812711D	0.84064
P/ 32	0.78422	S/ 32	0.94201	M812711M	0.85688
P/ 33	0.81740	S/ 33	0.93769	M811201N	0.86266
P/ 34	0.88873	S/ 34	0.92429	M811201M	0.80875
P/ 35	0.86981	S/ 37	0.96185	M812001B	0.84867
P/ 36	0.92637	SAMP S2	0.87564	M812001C	0.89470
P/ 37	0.82100	/R 23	0.90500	M812001D	0.82194
P/ 38	0.84099	/R 24	0.89817	M812001M	0.81513
P/ 41	0.77060	/R 31	0.95481	M812002B	0.89876
P/ 42	0.81732	B009301B	0.94197	M812001C	0.90771
P/ 43	0.87637	B009301C	0.95406	M812001D	0.86499
P/ 44	0.85636	B009301D	0.95267	M812001M	0.91680
P/ 45	0.83856	B009301E	0.93658	M812003B	0.87811
P/ 46	0.79113	B009301M	0.82239	M812003C	0.92138
P/ 47	0.87264	B009401B	0.85769	M812003D	0.89682
P/ 48	0.76559	B009401C	0.89311	M812003M	0.87967
P/ 51	0.80307	B009401D	0.87783	M812101B	0.88739
P/ 52	0.87510	B009401M	0.83927	M812101C	0.95249
P/ 53	0.83157	M812701B	0.90965	M812101D	0.98305
P/ 54	0.89636	M812701C	0.93011	M812101E	0.96073
P/ 55	0.80892	M812701D	0.84236	M812101F	0.94860
P/ 56	0.80434	M812701M	0.82648	M812101G	0.94817
P/ 57	0.82456	M812702B	0.89768	M812101M	0.76705
P/ 58	0.81977	M812702C	0.91660	MM00101B	0.90473
T/ 25	0.86093	M812701D	0.90267	MM00101C	0.90502
T/ 26	0.84930	M812701M	0.82565	MM00101D	0.92171
T/ 27	0.82121	M812703B	0.92509	MM00101M	0.84443
T/ 28	0.87708	M812703C	0.93064	MM00201B	0.95161
T/ 31	0.85837	M812703D	0.92087	MM00201C	0.95178
T/ 32	0.80234	M812703M	0.69206	MM00201D	0.94556
T/ 33	0.80283	M812705B	0.94087	MM00201M	0.88655
T/ 34	0.85945	M812705C	0.94574	MM00301B	0.92159
T/ 35	0.81043	M812705D	0.92095	MM00301C	0.92104
T/ 36	0.82767	M812705M	0.78616	MM00301D	0.92272
T/ 37	0.86522	M812706B	0.94530	MM00301M	0.83735
T/ 38	0.87206	M812706C	0.95627	MM00401B	0.90564
T/ 41	0.77217	M812706D	0.90033	MM00401C	0.90656
T/ 42	0.82045	M812706M	0.74296	MM00401D	0.90258
T/ 43	0.87237	M812707B	0.90126	MM00401M	0.85979
T/ 44	0.84620	M812707C	0.91977	MM00501B	0.91546
T/ 45	0.86059	M812707D	0.86700	MM00501C	0.91780
T/ 46	0.95946	M812707M	0.88850	MM00501D	0.91964
T/ 47	0.88866	M812708B	0.87445	MM00501M	0.86315
T/ 48	0.81806	M812708C	0.89525	B009701B	0.90685
T/ 51	0.85272	M812708D	0.83380	B009701C	0.89817
T/ 52	0.88552	M812708M	0.74980	B009701D	0.93126

Table C-11 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
B009701E	0.92208	M810709D	0.97616	C032207N	0.93248
B009701F	0.95144	M810709E	0.97474	C032207M	0.93447
B009701M	0.84595	M810709M	0.87758	C032209B	0.90029
GRAD HS	0.94110	M810708B	0.95046	C032209N	0.90276
ED > HS	0.96475	M810708C	0.94811	C032209M	0.98585
GRAD CLG	0.96336	M810708D	0.95470	C032210B	0.92826
GRAD SCH	0.94283	M810708E	0.95704	C032210N	0.92751
MISSING	0.77302	M810708M	0.84154	C032210M	0.95062
B009601B	0.87176	M810710B	0.90331	C032211B	0.90726
B009601C	0.84997	M810710C	0.90910	C032211N	0.88456
B009601D	0.84804	M810710D	0.95931	C032211M	0.98648
B009601M	0.88366	M810710E	0.91239	C037701B	0.90614
B009601B	0.94583	M810710M	0.87203	C037701C	0.91168
B009601C	0.92200	M810705B	0.86691	C037701D	0.90296
B009601D	0.85322	M810705C	0.89354	C037701M	0.98076
B009601M	0.86797	M810705D	0.91930	C037702B	0.92327
M812712B	0.94893	M810705E	0.90340	C037702C	0.93673
M812712C	0.95875	M810705M	0.92837	C037702D	0.93390
M812712D	0.95137	M810706B	0.94797	C037702M	0.97849
M812712M	0.72729	M810706C	0.94923	C037703B	0.91672
M812713B	0.95233	M810706D	0.96217	C037703C	0.93131
M812713C	0.97003	M810706E	0.92694	C037703D	0.93545
M812713D	0.96448	M810706M	0.92244	C037703M	0.99105
M812713M	0.77091	M810711B	0.88507	C037704B	0.88942
M812201N	0.89140	M810711C	0.89834	C037704C	0.89140
M812201M	0.76400	M810711D	0.91593	C037704D	0.90698
M812301N	0.81021	M810711E	0.90353	C037704M	0.98275
M812301M	0.83552	M810711M	0.90112	C037705B	0.90535
M812401N	0.82627	C031603N	0.91594	C037705C	0.90174
M812401M	0.84167	C031603M	0.96515	C037705D	0.89648
BASIC	0.93725	C031607N	0.92005	C037705M	0.98646
APPLIED	0.96260	C031607M	0.96658	C032402B	0.93467
PREALG	0.92809	C031610N	0.90820	C032402C	0.94533
ALG 1	0.95522	C031610M	0.94926	C032402D	0.93473
GEOMETRY	0.78999	C031606N	0.89310	C032401B	0.92963
INT/SEQ	0.81907	C031606M	0.95348	C032401C	0.94813
OTHER	0.88223	C035701N	0.90366	C032401D	0.93644
IDK	0.95595	C035701M	0.94218	C032404B	0.91664
MISSING	0.80969	C035702N	0.88445	C032404C	0.95186
M812701B	0.91250	C035702M	0.97011	C032404D	0.93068
M812701C	0.92949	C035703N	0.88549	C032406B	0.89857
M812701D	0.95011	C035703M	0.92685	C032406C	0.94637
M812701E	0.85028	C037201M	0.94973	C032406D	0.94673
M812701M	0.85388	C037202M	0.93131	C032406M	0.97844
M810701B	0.88582	C037204M	0.90177	C032407B	0.88564
M810701C	0.93173	C037205M	0.89256	C032407C	0.90939
M810701D	0.94071	C037206M	0.92693	C032408B	0.91070
M810701E	0.81516	C037301M	0.97405	C032408C	0.94679
M810701M	0.81252	C037302M	0.96113	C032408D	0.94800
M810707B	0.87195	C037304M	0.90304	C032409B	0.92746
M810707C	0.90383	C037305M	0.93896	C032409C	0.94160
M810707D	0.92895	C036601B	0.89148	C032409D	0.92181
M810707E	0.80457	C036601C	0.91413	C032410B	0.92980
M810707M	0.76770	C036601D	0.94539	C032410C	0.94784
M810709B	0.96430	C036601M	0.97685	C032410D	0.95246
M810709C	0.97372	C032207B	0.91227	C032411B	0.93020

Table C-11 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C032411C	0.91582	T056001D	0.87634	T056403M	0.86155
C032412B	0.91253	T056001E	0.88429	T056404M	0.89005
C032412C	0.93321	T056001F	0.85685	T056405M	0.87917
C032413B	0.91076	T056001M	0.98103	T056406M	0.86674
C032413C	0.94270	T040301B	0.89927	T056407M	0.89077
C032413D	0.94985	T040301C	0.91648	T056408M	0.86793
C032414B	0.94363	T040301D	0.93642	T056409M	0.86406
C032414C	0.95104	T040301E	0.94637	T056410M	0.87493
C032414D	0.88788	T040301M	0.99299	T056411M	0.89169
C032415B	0.92749	T056201B	0.90194	T056412M	0.88958
C032415C	0.89179	T056201C	0.88094	T056501B	0.89340
C032502B	0.90780	T056201D	0.88681	T056501C	0.91637
C032502C	0.91345	T056201E	0.88529	T056501D	0.90411
C032503B	0.92169	T056201F	0.88692	T056501E	0.89452
C032503C	0.90117	T056201M	0.95836	T056601B	0.86582
C032503M	0.98531	T040501N	0.89508	T056601C	0.85079
C032505B	0.91602	T040501C	0.88914	T056601D	0.87115
C032505C	0.90715	T040501M	0.88564	T056601E	0.87349
C032506B	0.90674	T040506N	0.92133	T056701M	0.86788
C032506C	0.90228	T040506C	0.87177	T056702M	0.87040
C032506D	0.90674	T040506M	0.92065	T056703M	0.86560
C033601B	0.92819	T040504N	0.87686	T056704M	0.85028
C033601C	0.92044	T040504C	0.87640	T056705M	0.86112
C033601D	0.90542	T040504M	0.89901	T056706M	0.85983
C036501B	0.91363	T040505N	0.89973	T056707M	0.84627
C036501C	0.90872	T040505C	0.87897	T056708M	0.87261
C037801B	0.91523	T040505M	0.90676	T056709M	0.85872
C037801C	0.92636	T056301B	0.88169	T056710M	0.86888
C037801D	0.89795	T056301C	0.94810	T056711M	0.86264
C037801E	0.89586	T056301D	0.93610	T056712M	0.85995
C037801F	0.91907	T056301E	0.88520	T056713M	0.86100
C037801G	0.89618	T056301F	0.89411	T041201B	0.88619
C037801H	0.93549	T056301G	0.88805	T041201C	0.88360
C037801M	0.97520	T056301M	0.97870	T041201D	0.95982
C038001B	0.90960	T040701M	0.87808	T056801B	0.88338
C038001C	0.90497	T040706M	0.88877	T056801C	0.89619
C038001D	0.88774	T040707M	0.86265	T056801D	0.92371
C038001E	0.89327	T040703M	0.87527	T056801E	0.93047
C038001G	0.93207	T040704M	0.86729	T056801F	0.91406
C038301N	0.91318	T040708M	0.86015	T056801M	0.97424
C038301M	0.96584	T040709M	0.86686	T056901M	0.90315
C038801N	0.90484	T040705M	0.88113	T0569A1M	0.88271
C038801M	0.94554	T040801M	0.87021	T0569B1M	0.87323
C034101M	0.91960	T040807M	0.87467	T0569C1M	0.89853
C034102M	0.85874	T040808M	0.87728	T056902M	0.90492
C034103M	0.88720	T040803M	0.87427	T0569A2M	0.91483
C034104M	0.90990	T040804M	0.87398	T0569B2M	0.89312
C034105M	0.91509	T040809M	0.86626	T0569C2M	0.88269
C034106M	0.88247	T040810M	0.86959	T056903M	0.90217
C034107M	0.90550	T040811M	0.86418	T0569A3M	0.89857
C034108M	0.89866	T040812M	0.86015	T0569B3M	0.89419
C034109M	0.89096	T040813M	0.86959	T0569C3M	0.89079
T055901B	0.85163	T040805M	0.87448	T056904M	0.89713
T055901M	0.98717	T040806M	0.89637	T0569A4M	0.88016
T056001B	0.83897	T056401M	0.88013	T0569B4M	0.89325
T056001C	0.85430	T056402M	0.87195	T0569C4M	0.87946

Table C-11 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T056905M	0.90363	T057402D	0.87643	T044502D	0.86751
T0569A5M	0.88528	T057402M	0.91986	T044502M	0.98905
T0569B5M	0.89336	T057403B	0.89899	T044512B	0.87988
T0569C5M	0.87814	T057403C	0.90091	T044512C	0.90848
T056906M	0.91481	T057403D	0.90774	T044512D	0.88274
T0569A6M	0.88477	T057403M	0.97727	T044512M	0.99337
T0569B6M	0.86503	T057404B	0.90022	T044513B	0.89689
T0569C6M	0.89837	T057404C	0.91687	T044513C	0.91988
T056907M	0.92663	T057404D	0.88966	T044513D	0.89134
T0569A7M	0.86584	T057404M	0.98207	T044513M	0.97943
T0569B7M	0.86403	T057405B	0.88958	T044514B	0.86173
T0569C7M	0.89780	T057405C	0.89392	T044514C	0.92439
T056908M	0.91516	T057405D	0.90055	T044514D	0.93344
T0569A8M	0.89206	T057501B	0.87004	T044514M	0.98310
T0569B8M	0.88691	T057501C	0.87899	T044505B	0.86382
T0569C8M	0.89879	T057501D	0.87228	T044505C	0.88513
T057001N	0.87328	T057501E	0.89439	T044505D	0.88931
T057001M	0.95849	T057501F	0.86958	T044505M	0.98431
T057002N	0.87625	T057501M	0.89914	T044515B	0.93339
T057002M	0.98859	T057601B	0.87712	T044515C	0.93540
T057003N	0.86007	T057601C	0.87547	T044515D	0.88233
T057003M	0.97643	T057601D	0.87891	T044515M	0.97711
T057004N	0.88587	T057601E	0.89050	T044507B	0.90372
T057004M	0.97313	T057601M	0.89058	T044507C	0.91545
T057005N	0.86140	T044002N	0.94282	T044507D	0.89482
T057005M	0.95776	T044002M	0.98489	T044507M	0.98104
T057006N	0.87462	T057701B	0.80117	T044516B	0.88722
T057006M	0.94233	T057701C	0.94548	T044516C	0.88880
T057007N	0.88237	T057701D	0.83031	T044516D	0.86928
T057007M	0.95541	T057701M	0.91628	T044516M	0.97995
T057101B	0.88244	T057801B	0.88089	T044508B	0.84325
T057101C	0.91693	T057801C	0.91023	T044508C	0.92874
T057101D	0.88574	T057801D	0.86027	T044508D	0.94464
T057101M	0.94623	T057801E	0.85474	T044509B	0.87212
T057201M	0.88932	T057801M	0.93020	T044509C	0.87988
T057211M	0.84955	T044201N	0.83582	T044509D	0.85133
T057221M	0.88253	T044201M	0.96610	T044509M	0.99242
T057231M	0.85572	T044301B	0.89014	T044510B	0.88301
T057241M	0.91787	T044301C	0.89524	T044510C	0.90142
T057301B	0.86461	T044301M	0.99158	T044510D	0.88009
T057301C	0.88359	T057901B	0.90917	T044506B	0.89947
T057301M	0.98678	T057901C	0.92372	T044506C	0.90503
T057302B	0.87224	T057901D	0.92095	T044506D	0.93084
T057302C	0.86300	T057901M	0.98451	T058001B	0.83872
T057303B	0.86019	T044401B	0.89582	T058001C	0.83924
T057303C	0.86201	T044401C	0.93311	T058001D	0.90580
T057303M	0.99279	T044401D	0.89211	T058001M	0.98657
T057304B	0.85741	T044401E	0.88988	T058002B	0.88574
T057304C	0.86730	T044401F	0.88699	T058002C	0.87935
T057304M	0.98213	T044401M	0.98353	T058002D	0.84904
T057401B	0.90660	T044501B	0.83880	T058002M	0.97487
T057401C	0.90346	T044501C	0.87046	T058003B	0.87332
T057401D	0.90436	T044501D	0.85452	T058003C	0.88309
T057401M	0.97563	T044501M	0.98985	T058003D	0.85618
T057402B	0.83963	T044502B	0.88893	T058003M	0.98302
T057402C	0.85985	T044502C	0.89621	T058004B	0.88710

Table C-11 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for

Mathematics Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance
T058004C	0.90237
T058004D	0.86892
T058004M	0.98773
T058005B	0.84985
T058005C	0.84628
T058005D	0.86918
T058005M	0.99108
T058006B	0.85669
T058006C	0.85238
T058006D	0.86313
T058006M	0.99161
T058007B	0.87286
T058007C	0.87980
T058007D	0.91941
T058007M	0.98868
T058008B	0.85248
T058008C	0.83660
T058008D	0.84409
T058008M	0.99088
T058009B	0.86469
T058009C	0.88677
T058009D	0.88230
T058009M	0.98684
T045401N	0.86512
T045401M	0.97901
T044801N	0.88113
T044801M	0.97237
T045001N	0.85439
T045001M	0.98589
T044901N	0.85653
T044901M	0.94842
T045304B	0.90464
T045304C	0.93677
T045304D	0.97602
T045304M	0.98756
T045305B	0.89497
T045305C	0.94552
T045305M	0.97247
T045302B	0.87919
T045302C	0.89584
T045302D	0.90152
T045302M	0.96954
T045303B	0.86732
T045303C	0.87521
T045303D	0.86656
T045303M	0.97131
T044000B	0.86154
T044000C	0.87006
T044000D	0.84851
T044000E	0.88671
T044000M	0.87980
C034201B	0.93716
C034201C	0.95747
C034201M	0.92975
C034402N	0.90187
C034402M	0.97077
C034403N	0.92593
C034403M	0.96844
C034401N	0.90517
C034401M	0.97825
C034406N	0.90995
C034406M	0.95625
C034510B	0.90143
C034510C	0.91646
C034510D	0.90488
C034510E	0.91600
C034510M	0.93872
C034511B	0.92490
C034512B	0.93015
C034513B	0.93065
C034514B	0.90435
C034514C	0.90408
C034514D	0.90448
C034514E	0.87394
C034514M	0.94466
C031611N	0.91608
C031611M	0.95481
C034601N	0.90328
C034601M	0.94237
C037203M	0.93229
C037306M	0.95528
C039401M	0.91790
C039402M	0.91270
C039403M	0.89748
C039404M	0.89834
C039405M	0.90496
C039406M	0.89760
C039501M	0.89080
C039502M	0.89988
C039503M	0.91084
C039504M	0.90820
C039505M	0.90996
C039601M	0.95724
C039602M	0.92269
C039603M	0.95032
C039604M	0.91266
C039605M	0.94171
C041901B	0.89919
C041901C	0.91499
C041901D	0.89592
T063001B	0.90690
T063001C	0.91075
T063001D	0.91973
T063001E	0.93261
T058301N	0.86272
T058301M	0.95759
NATLUNCH	0.93597
NATLUNCL	0.92837
REM READ	0.94925
REMREADL	0.94611
REM MATH	0.94516
REMMATHL	0.94199
NATLUN8	0.93663
NATLUN8L	0.94041
REMREAD8	0.94995
REMREA8L	0.91462
REMMATH8	0.95261
REMMAT8L	0.91353

Table C-12

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.92889	STGRD1-2	0.92029	R/T 44	0.92305
BLACK	0.92915	STGRD3-5	0.94783	R/T 45	0.95298
HISPANIC	0.97024	STGRD6>	0.95254	R/P 24	0.88973
ASIAN	0.92696	SCHCHG-1	0.90937	R/P 25	0.89812
MEXICAN	0.94406	SCHCHG-2	0.94307	R/P 31	0.90529
PUER RIC	0.96474	SCHCHG-3	0.86335	R/P 32	0.84951
CUBN,OTH	0.93574	DIS@HOM2	0.89647	R/P 33	0.88889
HISP-?	0.96206	DIS@HOM3	0.91935	R/P 34	0.89844
NON MSA	0.92470	DIS@HOM4	0.86792	R/P 35	0.90878
MID CTY5	0.94452	PGS>5	0.83637	R/P 41	0.85378
FR/BTWN5	0.94650	PGS>10	0.83038	R/P 42	0.93732
SML TWN5	0.95100	ACADEMIC	0.71063	R/P 43	0.95245
RURAL5	0.95572	VOC/TECH	0.91092	R/P 44	0.94376
URBAN FR	0.91208	OTHERPGM	0.90838	R/P 45	0.87956
MED CITY	0.87491	HS PGM-?	0.87226	R/S 31	0.97236
SM PLACE	0.92893	SEMENG-^	0.87039	R/S 32	0.95845
HS GRAD	0.94287	#ENG-LIN	0.87227	R/S 33	0.96573
POST HS	0.93664	SEMMAT02	0.94877	R/S 41	0.93453
COL GRAD	0.93811	SEMMAT03	0.93763	R/S 42	0.96601
PARED-?	0.94441	SEMMAT04	0.95305	R/S 43	0.96263
S EAST	0.89733	SEMMAT-?	0.94796	T/P 25	0.80631
CENTRAL	0.91506	#MAT-LIN	0.95304	T/P 31	0.78804
WEST	0.90241	SEMSCI-^	0.88033	T/P 32	0.79802
PRIVATE	0.92047	#SCI-LIN	0.83029	T/P 33	0.87480
CATHOLIC	0.91554	SEMHIS-^	0.87348	T/P 34	0.80810
IEP-NO	0.91519	#HIS-LIN	0.80868	T/P 35	0.78901
LEP-NO	0.83424	SEMFLG-^	0.87828	T/P 41	0.79959
CHAP1-N	0.79997	#FLG-LIN	0.74314	T/P 42	0.87871
RED PRIC	0.96378	SEMVOC-^	0.86063	T/P 43	0.81009
FREE	0.78963	#VOC-LIN	0.83484	T/P 44	0.79426
INFO N/A	0.82443	SEMART-^	0.88550	T/P 45	0.81519
SCH/REF	0.84379	#ART-LIN	0.82482	T/P 51	0.83235
HL-SOME	0.86310	G/R 22	0.91066	T/P 52	0.77231
HL-ALWAY	0.80564	G/R 23	0.91334	T/P 53	0.78145
HL-?	0.88175	G/R 24	0.94772	T/P 54	0.81725
B008901N	0.93293	G/T 22	0.72438	T/P 55	0.85260
B008901M	0.77599	G/T 23	0.73222	T/S 32	0.94803
TVLIN-0	0.97819	G/T 24	0.74637	T/S 33	0.91833
TV-QUAD	0.97739	G/T 25	0.74718	T/S 41	0.93893
HW-NO	0.96859	G/P 22	0.86244	T/S 42	0.92502
HW-YES	0.97042	G/P 23	0.90798	T/S 43	0.94205
HWLIN-0	0.92895	G/P 24	0.83393	T/S 52	0.93511
HWQUAD-0	0.89826	G/P 25	0.88757	P/S 32	0.95344
HITEM=3	0.89943	G/S 22	0.93286	P/S 33	0.93108
HITEM=4	0.87168	G/S 23	0.91873	P/S 41	0.94648
MOMHOM-N	0.81991	R/T 24	0.88537	P/S 42	0.92627
MOMHOM-?	0.82492	R/T 25	0.86606	P/S 43	0.93095
DADHOM-N	0.80223	R/T 31	0.87988	P/S 51	0.91136
DADHOM-?	0.81180	R/T 32	0.90904	P/S 52	0.95316
MISS-2<	0.95102	R/T 33	0.88724	P/S 53	0.95220
USA >5	0.85200	R/T 34	0.89011	G/S 22	0.91882
USA 3-5	0.87304	R/T 35	0.90835	G/S 23	0.92822
USA <3	0.88979	R/T 41	0.90889	G/S 24	0.89374
USA-?	0.88018	R/T 42	0.91443	G/S 25	0.91531
SNRM-LIN	0.84637	R/T 43	0.91285	R/S 24	0.90850

Table C-12 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
R/S 25	0.89901	B009301C	0.96313	M812001D	0.82854
R/S 31	0.89188	B009301D	0.96473	M812001M	0.92458
R/S 32	0.87660	B009301E	0.94429	M812003B	0.86440
R/S 33	0.91231	B009301M	0.85486	M812003C	0.85592
R/S 34	0.90430	B009401B	0.84742	M812003D	0.85387
R/S 35	0.90898	B009401C	0.91078	M812003M	0.91317
R/S 41	0.86200	B009401D	0.89509	M812101B	0.92796
R/S 42	0.96148	B009401M	0.86608	M812101C	0.92880
R/S 43	0.95207	M812701B	0.94299	M812101D	0.95261
R/S 44	0.94882	M812701C	0.93163	M812101E	0.94985
R/S 45	0.93292	M812701D	0.80006	M812101F	0.94558
P/S 25	0.82873	M812701M	0.90305	M812101G	0.93445
P/S 31	0.83186	M812702B	0.91453	M812101M	0.72041
P/S 32	0.82603	M812702C	0.93249	MM00101B	0.94768
P/S 33	0.86589	M812701D	0.88981	MM00101C	0.93958
P/S 34	0.82924	M812701M	0.89179	MM00101D	0.93427
P/S 35	0.85286	M812703B	0.91990	MM00101M	0.84862
P/S 41	0.84079	M812703C	0.93357	MM00201B	0.95098
P/S 42	0.84679	M812703D	0.89724	MM00201C	0.94926
P/S 43	0.83543	M812703M	0.75234	MM00201D	0.93590
P/S 44	0.84071	M812705B	0.96117	MM00201M	0.88012
P/S 45	0.84846	M812705C	0.95786	MM00301B	0.95948
P/S 51	0.84557	M812705D	0.94391	MM00301C	0.96544
P/S 52	0.88887	M812705M	0.70579	MM00301D	0.95838
P/S 53	0.89799	M812706B	0.94209	MM00301M	0.89161
P/S 54	0.90936	M812706C	0.94233	MM00401B	0.94518
P/S 55	0.82638	M812706D	0.83293	MM00401C	0.95820
T/S 25	0.78320	M812706M	0.69415	MM00401D	0.94797
T/S 31	0.78789	M812707B	0.91333	MM00401M	0.88277
T/S 32	0.79978	M812707C	0.92045	MM00501B	0.94211
T/S 33	0.85158	M812707D	0.86804	MM00501C	0.94736
T/S 34	0.79937	M812707M	0.72257	MM00501D	0.92707
T/S 35	0.78979	M812708B	0.91510	MM00501M	0.86945
T/S 41	0.79607	M812708C	0.92602	B009601B	0.96300
T/S 42	0.82956	M812708D	0.80625	B009601C	0.82502
T/S 43	0.80830	M812708M	0.84040	B009601D	0.82014
T/S 44	0.79344	M812709B	0.93844	B009601M	0.90689
T/S 45	0.80760	M812709C	0.93740	B009601B	0.96814
T/S 51	0.83959	M812709D	0.81655	B009601C	0.94405
T/S 52	0.80603	M812709M	0.79137	B009601D	0.81806
T/S 53	0.81159	M812710B	0.93004	B009601M	0.88549
T/S 54	0.81583	M812710C	0.93262	M812712B	0.94634
T/S 55	0.87592	M812710D	0.90046	M812712C	0.94978
S/S 23	0.94322	M812710M	0.73863	M812712D	0.93745
S/S 24	0.92931	M812711B	0.89780	M812712M	0.76943
S/S 25	0.92106	M812711C	0.92079	M812713B	0.97058
S/S 31	0.93316	M812711D	0.83461	M812713C	0.98047
S/S 32	0.93324	M812711M	0.80236	M812713D	0.97780
S/S 33	0.92511	M811201N	0.84007	M812713M	0.83470
S/S 34	0.90509	M811201M	0.83676	M812201N	0.92856
S/S 35	0.92779	M812001B	0.83237	M812201M	0.75873
SAMP S2	0.84496	M812001C	0.87232	M812301N	0.90158
/R 23	0.89288	M812001D	0.85506	M812301M	0.88514
/R 24	0.91002	M812001M	0.90125	M812401N	0.75286
/R 31	0.95448	M812002B	0.83705	M812401M	0.76428
B009301B	0.94509	M812001C	0.87673	M812701B	0.89155

Table C-12 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
M812701C	0.94357	OTHER	0.95012	M811014C	0.92952
M812701D	0.94946	MISSING	0.89138	M811014D	0.91739
M812701E	0.85459	OFFICE W	0.94234	M811014M	0.72346
M812701M	0.89191	TECHNIC	0.97251	M811004B	0.86588
M810701B	0.88919	PROT SRV	0.96321	M811004C	0.87451
M810701C	0.94654	SALES	0.95678	M811004D	0.85508
M810701D	0.93144	OWNER	0.96696	M811004M	0.83351
M810701E	0.82369	SERV WRK	0.95346	M811005B	0.88832
M810701M	0.85934	SKILL T	0.97118	M811005C	0.92215
M810707B	0.89511	LABORER	0.95498	M811005D	0.84635
M810707C	0.93724	OPERATOR	0.95170	M811005M	0.84901
M810707D	0.93885	FARMER	0.96317	M811006B	0.91509
M810707E	0.80012	HOMEMAKE	0.85064	M811006C	0.94481
M810707M	0.78312	MANAGER	0.97064	M811006D	0.86813
M810709B	0.97172	MILITARY	0.97445	M811006M	0.82563
M810709C	0.97283	TEACHER	0.93819	M811007B	0.94606
M810709D	0.98478	PROFESS1	0.95860	M811007C	0.89898
M810709E	0.98017	PROFESS2	0.97452	M811007D	0.91453
M810709M	0.81868	B011A01N	0.84863	M811007M	0.80535
M810708B	0.96101	OFFICE	0.97488	M811008B	0.93516
M810708C	0.97105	TECHNIC	0.96419	M811008C	0.90089
M810708D	0.96817	PROT SRV	0.96755	M811008D	0.92676
M810708E	0.95129	SALES	0.96678	M811008M	0.86758
M810708M	0.77785	OWNER	0.95490	M811012B	0.94521
M810710B	0.90819	SERV WRK	0.97190	M811012C	0.95911
M810710C	0.90931	SKILL TR	0.95445	M811012D	0.92003
M810710D	0.95848	LABORER	0.94934	M811012M	0.90186
M810710E	0.84153	OPERATOR	0.94201	M811009B	0.96115
M810710M	0.83574	FARMER	0.94369	M811009C	0.96577
M810705B	0.89777	HOMEMAKE	0.95674	M811009D	0.96424
M810705C	0.91620	MANAGER	0.96598	M811009M	0.91124
M810705D	0.93308	MILITARY	0.97771	M811011B	0.90893
M810705E	0.87146	TEACHER	0.95096	M811011C	0.97182
M810705M	0.82100	PROFESS1	0.94708	M811011D	0.93567
M810706B	0.93812	PROFESS2	0.91694	M811011M	0.90579
M810706C	0.94644	B012A02N	0.81736	M812801N	0.84653
M810706D	0.95249	M810901N	0.80953	M812801M	0.83905
M810706E	0.93335	M810901M	0.82090	C035701N	0.86686
M810706M	0.88532	M811801B	0.91589	C035701M	0.93081
M810711B	0.93470	M811801C	0.97455	C035702N	0.89168
M810711C	0.94493	M811801D	0.93853	C035702M	0.97529
M810711D	0.94052	M811801E	0.91037	C035703N	0.87631
M810711E	0.91279	M811801M	0.77042	C035703M	0.93179
M810711M	0.88385	M811001B	0.87459	C037201M	0.94402
B008301D	0.93996	M811001C	0.93298	C037202M	0.92866
B008301M	0.78877	M811001D	0.81116	C037204M	0.89740
B009901B	0.91112	M811001M	0.75042	C037205M	0.89736
B009901C	0.89614	M811002B	0.95531	C037206M	0.90217
B009901D	0.95457	M811002C	0.96639	C037301M	0.96296
B009901E	0.86926	M811002D	0.95585	C037302M	0.96132
B009901F	0.90848	M811002M	0.83289	C037304M	0.90405
B009901M	0.84227	M811014B	0.95058	C037305M	0.91941
VOC COLL	0.95667	M811014C	0.95387	C036601B	0.89703
2 YR COL	0.95115	M811014D	0.93483	C036601C	0.91500
4 YR COL	0.90968	M811014M	0.80040	C036601D	0.95387
MILITARY	0.96617	M811014B	0.92280	C036601M	0.97024

Table C-12 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C032207B	0.92302	C032411C	0.93713	C037203M	0.88792
C032207N	0.94402	C032411D	0.90612	C037306M	0.95734
C032207M	0.92083	C032412B	0.91793	C035002N	0.93828
C032209B	0.91337	C032412C	0.94392	C035002M	0.98503
C032209N	0.93446	C032412D	0.90855	C035003N	0.92750
C032209M	0.94787	C032413B	0.90748	C035003M	0.97758
C032210B	0.93101	C032413C	0.94639	C035006N	0.90580
C032210N	0.94633	C032413D	0.94378	C035006M	0.96848
C032210M	0.93765	C032413M	0.97446	C035007N	0.87812
C032211B	0.88637	C032414B	0.91207	C035007M	0.93619
C032211N	0.90622	C032414C	0.94107	C040201C	0.92029
C032211M	0.94126	C032414D	0.88274	C040201D	0.95054
C037701B	0.90046	C032415B	0.92605	C040201E	0.95411
C037701C	0.89540	C032415C	0.92522	C040201F	0.92232
C037701D	0.89470	C032502B	0.90450	C040201M	0.98935
C037701M	0.95870	C032502C	0.90350	C040202C	0.91346
C037702B	0.91199	C032502D	0.94285	C040202D	0.95124
C037702C	0.92385	C032502M	0.97611	C040202E	0.92503
C037702D	0.89213	C032503B	0.90781	C040203E	0.92372
C037702M	0.96807	C032503C	0.90315	C040203F	0.94662
C037703B	0.89290	C032503M	0.97893	C040204B	0.89422
C037703C	0.90844	C032505B	0.88865	C040204C	0.88909
C037703D	0.91385	C032505C	0.89919	C040204D	0.88218
C037703M	0.98568	C032506B	0.89021	C040204M	0.95160
C037704B	0.88396	C032506C	0.88718	C040301M	0.92441
C037704C	0.88768	C032506D	0.92530	C040302M	0.87495
C037704D	0.91019	C033601B	0.91818	C040303M	0.88201
C037704M	0.93188	C033601C	0.92725	C040304M	0.91946
C037705B	0.89396	C033601D	0.88997	C040305M	0.87201
C037705C	0.89019	C033601M	0.96468	C040306M	0.88846
C037705D	0.86953	C036501B	0.89604	C040307M	0.86896
C037705M	0.94772	C036501C	0.90429	C040308M	0.86455
C032402B	0.92107	C037801B	0.89556	C040309M	0.89038
C032402C	0.92528	C037801C	0.90588	C040310M	0.89854
C032402D	0.90811	C037801D	0.91885	C040311M	0.90704
C032402M	0.99466	C037801E	0.91122	C040401N	0.95301
C032401B	0.89473	C037801F	0.90982	C040401M	0.98325
C032401C	0.93144	C037801G	0.91465	C040402N	0.92195
C032401D	0.89418	C037801M	0.98176	C040402M	0.94504
C032404B	0.88648	C038001B	0.84995	C040403N	0.95216
C032404C	0.94295	C038001C	0.90179	C040404N	0.94319
C032404D	0.93133	C038001D	0.93271	C040501M	0.89832
C032406B	0.88220	C038001M	0.98025	C040502M	0.85814
C032406C	0.94367	C038301N	0.88718	C040503M	0.87339
C032406D	0.94071	C038301M	0.93248	C040504M	0.88199
C032407B	0.85721	C038801N	0.90293	C040505M	0.88898
C032407C	0.90257	C038801M	0.92243	C040506M	0.87669
C032408B	0.89199	C034101M	0.88453	C040601M	0.89355
C032408C	0.87317	C034102M	0.88179	C040602M	0.89762
C032409B	0.92022	C034103M	0.88071	C040603M	0.88420
C032409C	0.93469	C034104M	0.90456	C040604M	0.87274
C032409D	0.90807	C034105M	0.89147	C040605M	0.85977
C032410B	0.90849	C034106M	0.87657	C040701M	0.90518
C032410C	0.93557	C034107M	0.90138	C040702M	0.89943
C032410D	0.92060	C034108M	0.89179	C040703M	0.90987
C032411B	0.92589	C034109M	0.89172	C040704M	0.87241

Table C-12 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Mathematics Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C040705M	0.91477				
C040801B	0.89997				
C040801C	0.88676				
C040801D	0.90481				
C040801E	0.89002				
C040801F	0.90652				
C040801G	0.91176				
C040801M	0.91525				
C040802B	0.90037				
C040802C	0.90687				
C040802D	0.91291				
C040802E	0.88286				
C040802F	0.90444				
C040802G	0.90068				
C040802M	0.92939				
C040803B	0.87355				
C040803C	0.87565				
C040803D	0.87617				
C040803G	0.90965				
C040803M	0.88149				
C040804B	0.86226				
C040804C	0.91401				
C040804D	0.91207				
C040804E	0.89213				
C040804F	0.87585				
C040804G	0.92287				
C040804M	0.94197				
C040901M	0.91375				
C040902M	0.89865				
C040903M	0.91475				
C040904M	0.90002				
C040905M	0.93204				
C041001B	0.91548				
C041001C	0.87835				
C041001D	0.88912				
C041101B	0.91241				
C041101C	0.89830				
C036001B	0.89703				
C036001C	0.88469				
C036001D	0.87517				
NATLUNCH	0.89506				
NATLUNCL	0.89650				
REM READ	0.87890				
REMREADL	0.90861				
REMMATHL	0.90472				

Table C-13

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.91651	STGRD1-2	0.87161	R/S 41	0.94664
BLACK	0.93312	STGRD3>	0.84855	R/S 42	0.96346
HISPANIC	0.96527	SNRM-LIN	0.89875	R/S 43	0.97550
ASIAN	0.95176	B009201B	0.85946	T/P 25	0.78665
MEXICAN	0.93869	B009201C	0.89060	T/P 31	0.83830
PUER RIC	0.92524	B009201D	0.84523	T/P 32	0.78928
CUBN,OTH	0.96503	B009201M	0.81101	T/P 33	0.76732
HISP-?	0.81924	DIS@HOM2	0.86885	T/P 34	0.76387
NON MSA	0.95741	DIS@HOM3	0.91087	T/P 35	0.78267
MID CTY5	0.95016	DIS@HOM4	0.78205	T/P 41	0.76155
FR/BTWN5	0.94663	1-2 WEEK	0.94751	T/P 42	0.75914
SML TWN5	0.95003	1-2 MTH	0.95215	T/P 43	0.79689
RURAL5	0.96741	NEVER	0.94409	T/P 44	0.80321
URBAN FR	0.90792	NO COMP	0.93048	T/P 45	0.83598
MED CITY	0.91599	MISSING	0.86738	T/P 51	0.81841
SM PLACE	0.93846	G/R 22	0.91396	T/P 52	0.79478
HS GRAD	0.93658	G/R 23	0.90912	T/P 53	0.81808
POST HS	0.92025	G/R 24	0.96268	T/P 54	0.79771
COL GRAD	0.92303	G/T 22	0.69418	T/P 55	0.80328
PARED-?	0.93244	G/T 23	0.66997	T/S 32	0.95828
S EAST	0.89914	G/T 24	0.77415	T/S 33	0.93286
CENTRAL	0.91367	G/T 25	0.73587	T/S 41	0.94266
WEST	0.89828	G/P 22	0.91395	T/S 42	0.93954
PRIVATE	0.92836	G/P 23	0.88694	T/S 43	0.95438
CATHOLIC	0.92022	G/P 24	0.84063	T/S 51	0.94557
IEP-NO	0.93526	G/P 25	0.84875	T/S 52	0.97040
LEP-NO	0.79947	G/S 22	0.92396	T/S 53	0.96619
CHAP1-N	0.75390	G/S 23	0.90171	P/S 32	0.95468
REDUCED	0.91147	R/T 24	0.86023	P/S 33	0.92734
FREE	0.72822	R/T 25	0.89305	P/S 41	0.94834
INFO NA	0.84735	R/T 31	0.87802	P/S 42	0.90951
SCH REF	0.89453	R/T 32	0.89389	P/S 43	0.94043
HL-SOME	0.84839	R/T 33	0.86112	P/S 51	0.92263
HL-ALWAY	0.79850	R/T 34	0.86129	P/S 52	0.94462
HL-?	0.73669	R/T 35	0.88236	P/S 53	0.92977
TVLIN-0	0.98029	R/T 41	0.88877	B008901N	0.95010
TV-QUAD	0.98000	R/T 42	0.91771	B008901M	0.64425
HW-NO	0.96073	R/T 43	0.92809	SAFE	0.87260
HW-YES	0.96470	R/T 44	0.93044	UNSAFE	0.90710
HWLIN-0	0.98137	R/T 45	0.95100	VRUNSAFE	0.88994
HWQUAD-0	0.97281	R/P 24	0.89904	MISSING	0.84004
1-2 HRS	0.91902	R/P 25	0.88076	MOMHOM-N	0.80557
3-4 HRS	0.94019	R/P 31	0.90960	MOMHOM-?	0.79943
5-6 HRS	0.95904	R/P 32	0.91029	DADHOM-N	0.83554
7-8 HRS	0.96322	R/P 33	0.89805	DADHOM-?	0.82552
9-10 HRS	0.96691	R/P 34	0.89852	K811001B	0.82197
> 10 HRS	0.94955	R/P 35	0.89951	K811001C	0.85117
B009101M	0.77222	R/P 41	0.89486	K811001M	0.78778
HITEM=3	0.86009	R/P 42	0.97268	K811002B	0.83114
HITEM=4	0.81060	R/P 43	0.96015	K811002C	0.84120
MISS-2<	0.92655	R/P 44	0.96464	K811002M	0.74258
USA >5	0.90593	R/P 45	0.96335	K811003B	0.80011
USA 3-5	0.92725	R/S 31	0.95642	K811003C	0.79434
USA <3	0.92754	R/S 32	0.96868	K811003M	0.64436
USA-?	0.78635	R/S 33	0.96432	K811004B	0.80713

Table C-13 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
K811004C	0.80115	K811605M	0.81252	SM00101C	0.85860
K811004M	0.67661	K811606B	0.92744	SM00101D	0.90776
K811005B	0.88234	K811606C	0.93016	SM00101M	0.86142
K811005C	0.86102	K811606D	0.90992	SM00201B	0.90458
K811005M	0.72124	K811606M	0.73070	SM00201C	0.90363
K811006B	0.94116	K811607B	0.91407	SM00201D	0.90657
K811006C	0.92431	K811607C	0.91450	SM00201M	0.88572
K811006M	0.77614	K811607D	0.90192	SM00301B	0.87162
K811007B	0.88338	K811607M	0.77303	SM00301C	0.85440
K811007C	0.87999	K811608B	0.91591	SM00301D	0.90224
K811007M	0.74157	K811608C	0.92996	SM00301M	0.83821
K811008B	0.84335	K811608D	0.90372	SM00401B	0.88524
K811008C	0.83097	K811608M	0.82830	SM00401C	0.89177
K811008M	0.83133	K811609B	0.89975	SM00401D	0.92217
K811101M	0.85314	K811609C	0.93252	SM00401M	0.90223
K811102M	0.75917	K811609D	0.88360	SM00501B	0.85850
K811103M	0.74925	K811609M	0.83978	SM00501C	0.87820
K811104M	0.76326	K811610B	0.93662	SM00501D	0.86234
K811105M	0.74473	K811610C	0.92396	SM00501M	0.88279
K811106M	0.70566	K811610D	0.92722	B009501N	0.93679
K811107M	0.74751	K811610M	0.80885	B009501C	0.81293
K811108M	0.92666	K811611B	0.94193	B009501M	0.85361
K811201B	0.88957	K811611C	0.93725	B009502N	0.95137
K811201C	0.91390	K811611D	0.93167	B009502C	0.84209
K811201D	0.92028	K811611M	0.83030	B009502M	0.85508
K811201E	0.93299	K811612B	0.94534	C030901B	0.89403
K811201M	0.87365	K811612C	0.93793	C030901C	0.90221
K811301B	0.92638	K811612D	0.91572	C030901M	0.97962
K811301C	0.93837	K811612M	0.86702	C037101B	0.92384
K811301D	0.94938	K811701B	0.90475	C037101C	0.92028
K811301E	0.96340	K811701C	0.91033	C037101N	0.94104
K811301F	0.96269	K811701D	0.84629	C037101M	0.94257
K811301M	0.88178	K811701M	0.87126	C031212B	0.87125
K811401N	0.84490	K811702B	0.94339	C031212M	0.96859
K811401M	0.89888	K811702C	0.94654	C031205B	0.89767
K811501N	0.75563	K811702D	0.94051	C031205C	0.90190
K811501M	0.90556	K811702M	0.88966	C031205M	0.94785
K811601B	0.90579	K811703B	0.93095	C031213M	0.95871
K811601C	0.93331	K811703C	0.94496	C031214B	0.92465
K811601D	0.86144	K811703D	0.92911	C031214C	0.93150
K811601M	0.78641	K811703M	0.87002	C031214D	0.89904
K811602B	0.93446	K811704B	0.89118	C031214E	0.91092
K811602C	0.93522	K811704C	0.93560	C031214M	0.94845
K811602D	0.91488	K811704D	0.89198	C031603N	0.89974
K811602M	0.80978	K811704M	0.91996	C031603M	0.94317
K811603B	0.94079	K811705B	0.93027	C031607N	0.89448
K811603C	0.94416	K811705C	0.93831	C031607M	0.96400
K811603D	0.91219	K811705D	0.90084	C031601N	0.87885
K811603M	0.77565	K811705M	0.92413	C031601M	0.96929
K811604B	0.93590	K811801B	0.92272	C031610N	0.91936
K811604C	0.91399	K811801C	0.90026	C031610M	0.96212
K811604D	0.91171	K811801M	0.89963	C031606N	0.90036
K811604M	0.76089	K811901B	0.91691	C031606M	0.95365
K811605B	0.94002	K811901C	0.90711	C035701N	0.89605
K811605C	0.94156	K811901M	0.88535	C035701M	0.91746
K811605D	0.92541	SM00101B	0.85426	C035702N	0.90389

Table C-13 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C035702M	0.93199	C037704C	0.91613	C036501C	0.93032
C035703N	0.88916	C037704D	0.90235	C036501M	0.97935
C035703M	0.93495	C037704M	0.94786	C037801B	0.91450
C037201M	0.95553	C037705B	0.92164	C037801C	0.89298
C037202M	0.92137	C037705C	0.90676	C037801D	0.92829
C037207M	0.94860	C037705D	0.89117	C037801E	0.91023
C037204M	0.90422	C032402B	0.90070	C037801F	0.90574
C037205M	0.89754	C032402C	0.94641	C037801G	0.90165
C037206M	0.93927	C032402D	0.94378	C037801H	0.90540
C037301M	0.96994	C032402M	0.95157	C037801M	0.93753
C037302M	0.95988	C032401B	0.93303	C037901B	0.90514
C037303M	0.94894	C032401C	0.94412	C037901C	0.90170
C037304M	0.90594	C032401D	0.94804	C037901D	0.90960
C037305M	0.95441	C032401M	0.98947	C038001B	0.89636
C037401M	0.89597	C032404B	0.92340	C038001C	0.90399
C037402M	0.90113	C032404C	0.95081	C038001D	0.90048
C037403M	0.92514	C032404D	0.94137	C038001F	0.88251
C037404M	0.89399	C032404M	0.96651	C038301N	0.90020
C037405M	0.91465	C032406B	0.91596	C038801N	0.90155
C037406M	0.87946	C032406C	0.90435	C038801M	0.97431
C037501M	0.90453	C032407B	0.91061	C034101M	0.92230
C037502M	0.89548	C032407C	0.95076	C034102M	0.89611
C037503M	0.90802	C032407D	0.95552	C034103M	0.94551
C037504M	0.92563	C032407M	0.98151	C034104M	0.91301
C037505M	0.92290	C032408B	0.90945	C034105M	0.89582
C037601M	0.93328	C032408C	0.94772	C034106M	0.91470
C037602M	0.92709	C032408D	0.94886	C034107M	0.90153
C037603M	0.95951	C032408M	0.96953	C034108M	0.90872
C037604M	0.92443	C032409B	0.93628	C034109M	0.90109
C037605M	0.95223	C032409C	0.93266	T055901B	0.87479
C036601B	0.88504	C032409D	0.94444	T055901M	0.96866
C036601C	0.93206	C032410C	0.93272	T056001B	0.85043
C036601D	0.95477	C032411B	0.90528	T056001C	0.86327
C036601M	0.95288	C032411C	0.92930	T056001D	0.86537
C032207B	0.92922	C032412C	0.93921	T056001E	0.90289
C032207N	0.91089	C032413B	0.88499	T056001F	0.86833
C032207M	0.93632	C032413C	0.89413	T056001M	0.94320
C032209B	0.89828	C032414B	0.92372	T040301B	0.90532
C032209N	0.87527	C032414C	0.91823	T040301C	0.93146
C032209M	0.98238	C032415B	0.93497	T040301D	0.93576
C032210B	0.90543	C032415C	0.90676	T040301E	0.94781
C032210N	0.91405	C032502B	0.90056	T040301M	0.98027
C032210M	0.94207	C032502C	0.89916	T056101B	0.91259
C032211B	0.89516	C032502D	0.93295	T056101C	0.93748
C032211N	0.90357	C032503B	0.91273	T056101D	0.94770
C032211M	0.99172	C032503C	0.93271	T056101E	0.96263
C037701B	0.91761	C032505B	0.90764	T056101M	0.96167
C037701C	0.90801	C032505C	0.90822	T056102B	0.95393
C037701D	0.92439	C032505D	0.91176	T056102C	0.93711
C037702B	0.91405	C032506B	0.89234	T056102D	0.94738
C037702C	0.93501	C032506C	0.91856	T056102E	0.95662
C037702D	0.93940	C033601B	0.91617	T056102M	0.94851
C037703B	0.93418	C033601C	0.90915	T056201B	0.88672
C037703C	0.94161	C033601D	0.91403	T056201C	0.87479
C037703D	0.94797	C033601M	0.95663	T056201D	0.88203
C037704B	0.92282	C036501B	0.91852	T056201E	0.84446

Table C-13 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T056201F	0.85825	T056403M	0.85589	T056801C	0.89230
T056201M	0.91983	T056404M	0.86367	T056801D	0.92794
T040501N	0.83560	T056405M	0.87848	T056801E	0.89607
T040501C	0.90736	T056413M	0.86716	T056801F	0.88949
T040501M	0.89047	T056414M	0.90389	T056801M	0.94958
T040506N	0.94737	T056415M	0.90062	T060201B	0.92000
T040506C	0.94707	T056416M	0.90838	T060201C	0.94579
T040506M	0.94102	T056406M	0.87295	T060201D	0.92003
T040504N	0.94207	T056407M	0.87562	T060201E	0.91478
T040504C	0.92334	T056408M	0.87219	T060201F	0.90732
T040504M	0.95367	T056409M	0.86749	T060201M	0.95858
T040507N	0.94296	T056410M	0.87411	T060301M	0.87421
T040507C	0.94279	T056411M	0.90319	T060311M	0.88509
T040507M	0.94702	T056412M	0.89205	T060321M	0.87497
T040508N	0.94706	T056501B	0.88647	T060331M	0.88300
T040508C	0.93476	T056501C	0.88938	T060341M	0.86623
T040508M	0.95486	T056501D	0.89411	T060302M	0.90604
T040505N	0.88670	T056501E	0.89143	T060312M	0.85498
T040505C	0.87901	T056501M	0.94306	T060322M	0.91112
T040505M	0.88696	T058101B	0.88634	T060332M	0.88119
T056301B	0.86576	T058101C	0.89152	T060342M	0.88255
T056301C	0.93282	T058101D	0.87735	T060303M	0.88005
T056301D	0.93167	T058101E	0.88157	T060313M	0.83306
T056301E	0.88357	T058101M	0.96791	T060323M	0.92645
T056301G	0.89492	T056601B	0.88791	T060333M	0.88680
T056301M	0.95311	T056601C	0.87160	T060343M	0.88312
T040701M	0.87840	T056601D	0.89490	T060304M	0.89420
T040706M	0.86770	T056601E	0.89456	T060314M	0.86209
T040707M	0.86427	T056601M	0.96538	T060324M	0.93375
T040703M	0.89060	T058201B	0.88404	T060334M	0.88551
T040704M	0.89093	T058201C	0.85907	T060344M	0.89704
T040710M	0.88417	T058201D	0.88962	T060305M	0.92229
T040711M	0.92342	T058201E	0.86467	T060315M	0.88554
T040712M	0.91839	T058201M	0.96544	T060325M	0.90188
T040713M	0.93532	T056701M	0.86285	T060335M	0.89047
T040708M	0.86960	T056702M	0.87917	T060345M	0.87521
T040709M	0.88466	T056703M	0.85590	T060306M	0.87953
T040705M	0.88844	T056704M	0.85823	T060316M	0.85377
T040801M	0.88669	T056705M	0.84873	T060326M	0.88992
T040807M	0.86361	T056706M	0.85463	T060336M	0.84977
T040808M	0.86571	T056707M	0.85042	T060346M	0.85970
T040803M	0.89119	T056708M	0.86160	T060307M	0.88846
T040804M	0.87594	T056709M	0.86150	T060317M	0.96011
T040814M	0.87928	T056710M	0.86055	T060327M	0.95994
T040815M	0.95483	T056711M	0.87227	T060337M	0.90362
T040816M	0.94150	T056712M	0.86345	T060347M	0.90776
T040817M	0.91605	T056713M	0.85920	T060401M	0.84814
T040809M	0.86332	T041201B	0.90893	T060402M	0.86197
T040810M	0.88005	T041201C	0.92565	T060403M	0.86825
T040811M	0.87776	T041201D	0.88467	T060404M	0.86779
T040812M	0.87941	T041201M	0.98547	T060405M	0.86266
T040813M	0.86773	T041302N	0.93022	T060501N	0.85967
T040805M	0.86343	T041302M	0.90144	T060501M	0.93416
T040806M	0.87073	T041303N	0.91305	T060601B	0.87529
T056401M	0.88847	T041303M	0.91998	T060601C	0.88302
T056402M	0.87790	T056801B	0.86554	T060601D	0.89945

Table C-13 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T060601M	0.98632	T060801B	0.92551	T061305E	0.94363
T060602B	0.89151	T060801C	0.93240	T061306B	0.88254
T060602C	0.93844	T060801M	0.98743	T061306C	0.90312
T060602D	0.90940	T060901B	0.93158	T061306D	0.90891
T060602M	0.94668	T060901C	0.93591	T061306E	0.93034
T060603B	0.90724	T061001N	0.91202	T061307B	0.88521
T060603C	0.93143	T061001M	0.98196	T061307C	0.86756
T060603D	0.90517	T061101B	0.88422	T061307D	0.90171
T060603M	0.98055	T061101C	0.86186	T061307E	0.91337
T060604B	0.89483	T061101M	0.97686	T061307M	0.96368
T060604C	0.92361	T061102B	0.85567	T061308B	0.89370
T060604D	0.88300	T061102C	0.96220	T061308C	0.88299
T060604M	0.94484	T061102M	0.98334	T061308D	0.87586
T060605B	0.88991	T061103B	0.87809	T061308E	0.91111
T060605C	0.92415	T061103C	0.88451	T061308M	0.97867
T060605D	0.93407	T061103M	0.97978	T061309B	0.88476
T060605M	0.98883	T061104B	0.89582	T061309C	0.88316
T060606B	0.87899	T061104C	0.89609	T061309D	0.87785
T060606C	0.94199	T061104M	0.97552	T061309E	0.89188
T060606D	0.94163	T061105B	0.89677	T061309M	0.97721
T060606M	0.97172	T061105C	0.90152	T061310B	0.88162
T060607B	0.91855	T061105M	0.95800	T061310C	0.85340
T060607C	0.91617	T061106B	0.91773	T061310D	0.86935
T060607D	0.86690	T061106C	0.91940	T061310E	0.89975
T060607M	0.96799	T061107B	0.85928	T061310M	0.97042
T060608B	0.91945	T061107C	0.88080	T061401B	0.89801
T060608C	0.92808	T061107M	0.95604	T061401C	0.91559
T060608D	0.88940	T061108B	0.90244	T061401D	0.89104
T060608M	0.97707	T061108C	0.91920	T061401M	0.97890
T060609B	0.91789	T061108M	0.96316	T061501B	0.90299
T060609C	0.95337	T061109B	0.90216	T061501C	0.90394
T060609D	0.90651	T061109C	0.91645	T061501D	0.88877
T060609M	0.98558	T061109M	0.96285	T061501E	0.88255
T060610B	0.89244	T061201N	0.85080	T061501F	0.88173
T060610C	0.93467	T061201M	0.96119	T061501M	0.88715
T060610D	0.90222	T061301B	0.91510	T061601M	0.88212
T060610M	0.96781	T061301C	0.90641	T061611M	0.87828
T060611B	0.88331	T061301D	0.88445	T061621M	0.86907
T060611C	0.90780	T061301E	0.90907	T061631M	0.86113
T060611D	0.93529	T061301M	0.97112	T061641M	0.87562
T060611M	0.97020	T061302B	0.88943	T061651M	0.89760
T060701B	0.88527	T061302C	0.89580	T061701C	0.88626
T060701C	0.86155	T061302D	0.86364	T061701E	0.88636
T060701D	0.89594	T061302E	0.86412	T061701M	0.94247
T060702B	0.92325	T061302M	0.97288	T061801B	0.87449
T060702C	0.93876	T061303B	0.90705	T061801C	0.87469
T060702D	0.88673	T061303C	0.92973	T061801D	0.85703
T060703B	0.89777	T061303D	0.91196	T061801E	0.88894
T060703C	0.95750	T061303E	0.87885	T061801M	0.84784
T060703D	0.92713	T061304B	0.89552	T061901M	0.95569
T060704B	0.89563	T061304C	0.91273	T062001B	0.88898
T060704C	0.92015	T061304D	0.90015	T062001C	0.85320
T060704D	0.95093	T061304E	0.90184	T062001M	0.94992
T060705B	0.88473	T061305B	0.89481	T062002B	0.89213
T060705C	0.92378	T061305C	0.90307	T062002C	0.88992
T060705D	0.94478	T061305D	0.88751	T062002M	0.95118

Table C-13 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 4

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T062003B	0.91950				
T062003C	0.89596				
T062003D	0.90014				
T062003M	0.93908				
T062101B	0.87928				
T062101C	0.87528				
T062101D	0.89825				
T062101M	0.95016				
T062201M	0.86708				
T062202M	0.86001				
T062203M	0.84448				
T062204M	0.86846				
T062205M	0.85517				
T062206M	0.86636				
T062207M	0.86048				
T062208M	0.86099				
T062209M	0.86118				
T062210M	0.84056				
T062301B	0.91500				
T062301C	0.89514				
T062301D	0.89244				
T062301E	0.86790				
T062401B	0.86494				
T062401C	0.87876				
T062401D	0.85596				
T062401M	0.90603				
NATLUNCH	0.88877				
NATLUNCL	0.94512				
REMREADL	0.94139				
REMMATHL	0.94325				
NATLUN4L	0.94128				
REMREA4L	0.92554				
REMMAT4L	0.91214				

Table C-14

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.91614	B010101C	0.93096	R/P 34	0.87741
BLACK	0.92990	B010101D	0.91930	R/P 35	0.89102
HISPANIC	0.96684	B010101E	0.92367	R/P 41	0.86287
ASIAN	0.94591	B010101F	0.93928	R/P 42	0.96401
MEXICAN	0.92894	B010101G	0.95512	R/P 43	0.94772
PUER RIC	0.93935	B010101H	0.93420	R/P 44	0.95160
CUBN,OTH	0.93707	B010101M	0.87041	R/P 45	0.92827
HISP-?	0.91996	USA >5	0.89993	R/S 31	0.96624
NON MSA	0.94360	USA 3-5	0.86697	R/S 32	0.96493
MID CTY5	0.93750	USA <3	0.88452	R/S 33	0.96959
FR/BTWN5	0.95233	USA-?	0.79048	R/S 41	0.95100
SML TWN5	0.96189	SNRM-LIN	0.90986	R/S 42	0.96508
RURAL5	0.96124	DIS@HOM2	0.89041	R/S 43	0.95516
URBAN FR	0.92243	DIS@HOM3	0.92742	T/P 25	0.83367
MED CITY	0.91865	DIS@HOM4	0.81911	T/P 31	0.83020
SM PLACE	0.94745	1-2 WEEK	0.93788	T/P 32	0.79386
HS GRAD	0.94717	1-2 MTH	0.95331	T/P 33	0.83018
POST HS	0.93099	NEVER	0.94437	T/P 34	0.77702
COL GRAD	0.93104	NO COMP	0.92631	T/P 35	0.76449
PARED-?	0.94345	MISSING	0.85984	T/P 41	0.74285
S EAST	0.92674	LIFESCI	0.92125	T/P 42	0.82335
CENTRAL	0.91034	PHYSSCI	0.93355	T/P 43	0.82211
WEST	0.92103	EATHSCI	0.92607	T/P 44	0.82045
PRIVATE	0.92875	GEN SCI	0.93232	T/P 45	0.80729
CATHOLIC	0.92907	INTESCI	0.92713	T/P 51	0.86164
IEP-NO	0.93018	MISSING	0.92856	T/P 52	0.78413
LEP-NO	0.83100	G/R 22	0.89847	T/P 53	0.79276
CHAP1-N	0.75194	G/R 23	0.90431	T/P 54	0.76487
REDUCED	0.91650	G/R 24	0.95406	T/P 55	0.83446
FREE	0.72745	G/T 22	0.72773	T/S 32	0.93520
INFO NA	0.87544	G/T 23	0.69148	T/S 33	0.93512
SCH REF	0.90281	G/T 24	0.72904	T/S 41	0.94594
HL-SOME	0.85339	G/T 25	0.71284	T/S 42	0.93812
HL-ALWAY	0.79809	G/P 22	0.87625	T/S 43	0.95391
HL-?	0.80979	G/P 23	0.88131	T/S 51	0.96133
TVLIN-0	0.98037	G/P 24	0.78673	T/S 52	0.94122
TV-QUAD	0.98013	G/P 25	0.82195	T/S 53	0.95970
HW-NO	0.95915	G/S 22	0.93547	P/S 32	0.95706
HW-YES	0.96126	G/S 23	0.91639	P/S 33	0.94346
HWLIN-0	0.95941	R/T 24	0.88414	P/S 41	0.93082
HWQUAD-0	0.94546	R/T 25	0.86662	P/S 42	0.91747
1-2 HRS	0.87252	R/T 31	0.88462	P/S 43	0.92843
3-4 HRS	0.90544	R/T 32	0.89752	P/S 51	0.91823
5-6 HRS	0.94207	R/T 33	0.86054	P/S 52	0.95568
7-8 HRS	0.96277	R/T 34	0.87969	P/S 53	0.95059
9-10 HRS	0.96101	R/T 35	0.89570	G/ 22	0.91993
> 10 HRS	0.94668	R/T 41	0.87819	G/ 23	0.88869
B009101M	0.75282	R/T 42	0.90709	G/ 24	0.89713
HITEM=3	0.88494	R/T 43	0.92014	G/ 25	0.92382
HITEM=4	0.85134	R/T 44	0.93513	G/ 26	0.92393
MISS-2<	0.91161	R/T 45	0.94157	G/ 27	0.89480
1-2 GRDS	0.94676	R/P 24	0.88239	R/ 24	0.88571
3-5 GRDS	0.92313	R/P 25	0.87230	R/ 25	0.88127
> 5 GRDS	0.91742	R/P 31	0.89516		
MISSING	0.75547	R/P 32	0.84568		
B010101B	0.92025	R/P 33	0.88235		

Table C-14 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
R/ 26	0.89114	T/ 47	0.77813	K811103M	0.70933
R/ 27	0.89301	T/ 51	0.82041	K811104M	0.75621
R/ 31	0.87985	T/ 52	0.80377	K811105M	0.68818
R/ 32	0.88022	T/ 53	0.83346	K811106M	0.71854
R/ 33	0.88771	T/ 54	0.82488	K811107M	0.69382
R/ 34	0.88885	T/ 55	0.77455	K811108M	0.93086
R/ 35	0.89104	T/ 56	0.75942	K811201B	0.84019
R/ 36	0.89094	T/ 57	0.76203	K811201C	0.90405
R/ 37	0.88799	S/ 23	0.95122	K811201D	0.92124
R/ 41	0.88203	S/ 24	0.92274	K811201E	0.80101
R/ 42	0.95859	S/ 25	0.94121	K811201M	0.79853
R/ 43	0.94254	S/ 26	0.93674	K811401N	0.84590
R/ 44	0.94717	S/ 27	0.93221	K811401M	0.88161
R/ 45	0.94641	S/ 31	0.93462	K811501N	0.78834
R/ 46	0.94642	S/ 32	0.92677	K811501M	0.89711
R/ 47	0.95513	S/ 33	0.91612	K811601B	0.89197
P/ 25	0.77627	S/ 34	0.92593	K811601C	0.91423
P/ 26	0.72857	S/ 35	0.91833	K811601D	0.85585
P/ 27	0.77004	S/ 36	0.92749	K811601M	0.86567
P/ 31	0.77586	S/ 37	0.92679	K811602B	0.94775
P/ 32	0.76597	B008901N	0.91402	K811602C	0.95656
P/ 33	0.77922	B008901M	0.66302	K811602D	0.94647
P/ 34	0.79899	SAFE	0.82633	K811602M	0.85469
P/ 35	0.76460	UNSAFE	0.87104	K811603B	0.93454
P/ 36	0.80671	VRUNSAFE	0.88342	K811603C	0.94630
P/ 37	0.81010	MISSING	0.87016	K811603D	0.92746
P/ 41	0.80712	MOMHOM-N	0.82638	K811603M	0.72829
P/ 42	0.82500	MOMHOM-?	0.89993	K811604B	0.91165
P/ 43	0.75814	DADHOM-N	0.83372	K811604C	0.91959
P/ 44	0.73239	DADHOM-?	0.88324	K811604D	0.90370
P/ 45	0.75056	K811001B	0.86472	K811604M	0.80173
P/ 46	0.72796	K811001C	0.86809	K811605B	0.92286
P/ 47	0.77206	K811001M	0.90216	K811605C	0.96265
P/ 51	0.76185	K811002B	0.87834	K811605D	0.95109
P/ 52	0.81723	K811002C	0.83391	K811605M	0.80892
P/ 53	0.81640	K811002M	0.87099	K811606B	0.92998
P/ 54	0.81093	K811003B	0.80714	K811606C	0.95950
P/ 55	0.82528	K811003C	0.79994	K811606D	0.93549
P/ 56	0.82416	K811003M	0.83722	K811606M	0.77265
P/ 57	0.77089	K811004B	0.83708	K811609B	0.88827
T/ 25	0.79324	K811004C	0.78722	K811609C	0.93241
T/ 26	0.82756	K811004M	0.83116	K811609D	0.91500
T/ 27	0.82149	K811005B	0.88820	K811609M	0.78244
T/ 31	0.77091	K811005C	0.86514	K811610B	0.91748
T/ 32	0.77801	K811005M	0.87145	K811610C	0.92316
T/ 33	0.76151	K811006B	0.87376	K811610D	0.87468
T/ 34	0.75718	K811006C	0.82705	K811610M	0.80046
T/ 35	0.77436	K811006M	0.85432	K811611B	0.93837
T/ 36	0.79196	K811007B	0.86851	K811611C	0.96312
T/ 37	0.73520	K811007C	0.87603	K811611D	0.95086
T/ 41	0.72689	K811007M	0.81372	K811611M	0.85240
T/ 42	0.75406	K811008B	0.84769	K811612B	0.95105
T/ 43	0.80738	K811008C	0.81309	K811612C	0.95529
T/ 44	0.83782	K811008M	0.88759	K811612D	0.94703
T/ 45	0.85254	K811101M	0.72975	K811612M	0.84598
T/ 46	0.79455	K811102M	0.71801	K811701B	0.92557

Table C-14 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
K811701C	0.92739	B009601B	0.87602	C032207B	0.92927
K811701D	0.81938	B009601N	0.86451	C032207N	0.94546
K811701M	0.91797	B009601D	0.83509	C032207M	0.97639
K811702B	0.88975	B009601E	0.87279	C032209B	0.92106
K811702C	0.93695	B009602B	0.93300	C032209N	0.91132
K811702D	0.91557	B009602N	0.93749	C032209M	0.98314
K811702M	0.88220	B009602D	0.84613	C032210B	0.92488
K811703B	0.91571	B009602M	0.85463	C032210N	0.92843
K811703C	0.95734	K812101N	0.88273	C032210M	0.97860
K811703D	0.91535	K812101M	0.68304	C032211B	0.91891
K811703M	0.91578	K812201B	0.90121	C032211N	0.92395
K811704B	0.84774	K812201C	0.97806	C032211M	0.98808
K811704C	0.92386	K812201D	0.97145	C037701B	0.90725
K811704D	0.88198	K812201E	0.96189	C037701C	0.93778
K811704M	0.91560	K812201F	0.95603	C037701D	0.89634
K811705B	0.88071	K812201G	0.94666	C037701M	0.97900
K811705C	0.95244	K812201M	0.86237	C037702B	0.94639
K811705D	0.91098	K811613B	0.84497	C037702C	0.93730
K811705M	0.91713	K811613C	0.88635	C037702D	0.94056
K811801B	0.93819	K811613D	0.81316	C037702M	0.98515
K811801C	0.94240	K811613M	0.80864	C037703B	0.92938
K811801M	0.87096	K811614B	0.84704	C037703C	0.93699
K811901B	0.93512	K811614C	0.90033	C037703D	0.94122
K811901C	0.92890	K811614D	0.82387	C037704B	0.91366
K811901M	0.87312	K811614M	0.84082	C037704C	0.92668
SM00101B	0.90525	K811615B	0.95950	C037704D	0.94508
SM00101C	0.91770	K811615C	0.96202	C037705B	0.91635
SM00101D	0.93306	K811615D	0.95256	C037705C	0.92357
SM00101M	0.95285	K811615M	0.89083	C037705D	0.90238
SM00201B	0.93476	C031603N	0.90975	C032402B	0.93579
SM00201C	0.93711	C031603M	0.98092	C032402C	0.94391
SM00201D	0.93611	C031607N	0.92014	C032402D	0.94077
SM00201M	0.95767	C031607M	0.97281	C032401B	0.92283
SM00301B	0.90366	C031610N	0.93440	C032401C	0.94059
SM00301C	0.90169	C031610M	0.96670	C032401D	0.93269
SM00301D	0.90118	C031606N	0.91719	C032404B	0.92135
SM00301M	0.94894	C031606M	0.95685	C032404C	0.94445
SM00401B	0.88398	C035701N	0.91734	C032404D	0.92768
SM00401C	0.90140	C035701M	0.95147	C032406B	0.90498
SM00401D	0.87922	C035702N	0.90181	C032406C	0.94860
SM00401M	0.95275	C035702M	0.96955	C032406D	0.95961
SM00501B	0.85855	C035703N	0.90879	C032407B	0.91251
SM00501C	0.87566	C035703M	0.95440	C032407C	0.92244
SM00501D	0.86682	C037201M	0.92725	C032408B	0.90869
SM00501M	0.95177	C037202M	0.94087	C032408C	0.94606
B009701B	0.90354	C037204M	0.91201	C032408D	0.95375
B009701C	0.89062	C037205M	0.91814	C032409B	0.93567
B009701D	0.93025	C037206M	0.94486	C032409C	0.95068
B009701E	0.94423	C037301M	0.96584	C032409D	0.91318
B009701F	0.88957	C037302M	0.95274	C032410B	0.95175
B009701M	0.80372	C037304M	0.92484	C032410C	0.96093
B009801B	0.94022	C037305M	0.93716	C032410D	0.96021
B009801C	0.96009	C036601B	0.88832	C032411B	0.95345
B009801D	0.95302	C036601C	0.93494	C032411C	0.95621
B009801E	0.93544	C036601D	0.95643	C032411D	0.95241
B009801M	0.75458	C036601M	0.98130	C032412B	0.93736

Table C-14 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C032412C	0.94614	T040301C	0.91439	T056414M	0.89906
C032413B	0.91707	T040301D	0.92707	T056415M	0.88978
C032413C	0.94331	T040301E	0.93078	T056406M	0.90689
C032413D	0.95711	T040301M	0.98985	T056407M	0.83465
C032414B	0.94610	T056201B	0.92043	T056408M	0.89545
C032414C	0.95588	T056201C	0.90183	T056409M	0.89098
C032414D	0.91607	T056201D	0.88880	T056410M	0.89696
C032415B	0.94094	T056201E	0.88756	T056411M	0.91324
C032415C	0.92816	T056201F	0.90292	T056412M	0.91635
C032502B	0.91340	T056201M	0.96554	T056701M	0.90719
C032502C	0.93605	T040501N	0.89775	T056702M	0.90765
C032503B	0.93127	T040501C	0.89466	T056703M	0.88362
C032503C	0.93640	T040501M	0.92269	T056704M	0.89440
C032505B	0.92988	T040507N	0.93038	T056705M	0.88548
C032505C	0.93405	T040507C	0.90690	T056706M	0.89563
C032506B	0.93706	T040507M	0.94888	T056707M	0.89044
C032506C	0.90986	T040508N	0.89248	T056708M	0.89673
C032506D	0.93664	T040508C	0.89449	T056709M	0.89234
C033601B	0.93383	T040508M	0.91750	T056710M	0.89310
C033601C	0.94904	T040505N	0.89959	T056711M	0.89591
C033601D	0.91813	T040505C	0.91096	T056712M	0.88572
C036501B	0.93041	T040505M	0.90737	T056713M	0.90095
C036501C	0.89186	T056301C	0.95510	T041201B	0.92948
C037801B	0.92049	T056301D	0.94411	T041201C	0.92377
C037801C	0.94056	T056301E	0.93838	T041201D	0.90187
C037801D	0.92005	T056301F	0.88421	T041201M	0.97482
C037801E	0.89936	T056301G	0.93448	T056801B	0.90269
C037801F	0.90621	T040701M	0.89623	T056801C	0.89685
C037801G	0.89982	T040706M	0.90710	T056801D	0.93572
C037801H	0.97713	T040707M	0.89193	T056801E	0.92502
C038001B	0.92061	T040710M	0.89837	T056801F	0.92079
C038001C	0.93432	T040711M	0.89568	T056801M	0.97882
C038001D	0.91998	T040712M	0.89824	T060301M	0.89871
C038001E	0.92972	T040713M	0.91887	T060311M	0.88713
C038001F	0.95733	T040708M	0.87922	T060321M	0.91015
C038301N	0.89979	T040709M	0.89708	T060331M	0.90785
C038301M	0.97806	T040705M	0.88932	T060341M	0.89674
C038801N	0.90879	T040801M	0.87570	T060302M	0.91440
C038801M	0.96647	T040807M	0.89148	T060312M	0.88867
C034101M	0.92820	T040808M	0.88910	T060322M	0.90793
C034102M	0.87312	T040814M	0.88568	T060332M	0.91563
C034103M	0.91047	T040815M	0.90948	T060342M	0.89156
C034104M	0.90529	T040816M	0.89814	T060303M	0.90771
C034105M	0.92680	T040817M	0.91779	T060313M	0.91891
C034106M	0.91053	T040809M	0.87783	T060323M	0.91814
C034107M	0.90289	T040810M	0.91710	T060333M	0.93180
C034108M	0.92767	T040811M	0.89671	T060343M	0.88995
C034109M	0.90994	T040812M	0.88915	T060304M	0.90672
T055901B	0.88802	T040813M	0.91308	T060314M	0.88527
T055901M	0.98465	T040805M	0.88688	T060324M	0.92512
T056001B	0.89223	T040806M	0.90519	T060334M	0.89411
T056001C	0.86428	T056401M	0.90580	T060344M	0.87520
T056001D	0.88436	T056402M	0.90364	T060305M	0.89475
T056001E	0.87119	T056403M	0.91130	T060315M	0.91378
T056001M	0.96663	T056405M	0.89011	T060325M	0.90676
T040301B	0.88967	T056413M	0.90415	T060335M	0.89944

Table C-14 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T060345M	0.90127	T060611B	0.92131	T061302E	0.90358
T060306M	0.91021	T060611C	0.94551	T061302M	0.98735
T060316M	0.89986	T060611D	0.95990	T061303B	0.92772
T060326M	0.89358	T060611M	0.97921	T061303C	0.91672
T060336M	0.90101	T060701B	0.87986	T061303D	0.92102
T060346M	0.88824	T060701C	0.91720	T061303E	0.89028
T060307M	0.93028	T060701D	0.89237	T061303M	0.97771
T060317M	0.95089	T060701M	0.98628	T061304B	0.90561
T060327M	0.95911	T060702B	0.92521	T061304C	0.92062
T060337M	0.93385	T060702C	0.92786	T061304D	0.91873
T060347M	0.94106	T060702D	0.88744	T061304E	0.90233
T060401M	0.89735	T060703B	0.93667	T061305B	0.91260
T060402M	0.90556	T060703C	0.96062	T061305C	0.90751
T060403M	0.90690	T060703D	0.92577	T061305D	0.91166
T060404M	0.90239	T060704B	0.92499	T061305E	0.94292
T060405M	0.88399	T060704C	0.94650	T061306B	0.90959
T060501N	0.88255	T060704D	0.96097	T061306C	0.90314
T060501M	0.96558	T060704M	0.98845	T061306D	0.91100
T060601B	0.89817	T060705B	0.91501	T061306E	0.92821
T060601C	0.90725	T060705C	0.91963	T061307B	0.91269
T060601D	0.91362	T060705D	0.94025	T061307C	0.89753
T060601M	0.98229	T060801B	0.92565	T061307D	0.92324
T060602B	0.91039	T060801C	0.94636	T061307E	0.92166
T060602C	0.94621	T060801M	0.98460	T061308B	0.90178
T060602D	0.93498	T060901B	0.92840	T061308C	0.89947
T060602M	0.97138	T060901C	0.94011	T061308D	0.87906
T060603B	0.92096	T061001N	0.92429	T061308E	0.92257
T060603C	0.92704	T061101B	0.90209	T061309B	0.88125
T060603D	0.90280	T061101C	0.89796	T061309C	0.90314
T060603M	0.99358	T061102B	0.90173	T061309D	0.88450
T060604B	0.92797	T061102C	0.88588	T061309E	0.88346
T060604C	0.91529	T061103B	0.89462	T061310B	0.91339
T060604D	0.88505	T061103C	0.88815	T061310C	0.89561
T060604M	0.98204	T061104B	0.89675	T061310D	0.88164
T060605B	0.87990	T061104C	0.90901	T061310E	0.87982
T060605C	0.94006	T061105B	0.90915	T061401B	0.93338
T060605D	0.94583	T061105C	0.89809	T061401C	0.93784
T060606B	0.91430	T061106B	0.89719	T061401D	0.87774
T060606C	0.93240	T061106C	0.90879	T061501B	0.89898
T060606D	0.93459	T061106M	0.99140	T061501C	0.87609
T060606M	0.96897	T061107B	0.89008	T061501D	0.93697
T060607B	0.93251	T061107C	0.88150	T061501E	0.91172
T060607C	0.91844	T061108B	0.91325	T061501F	0.90437
T060607D	0.89907	T061108C	0.91792	T061501M	0.92621
T060607M	0.98348	T061109B	0.91804	T061601M	0.88164
T060608B	0.92186	T061109C	0.93857	T061611M	0.90275
T060608C	0.92566	T061109M	0.97808	T061621M	0.90213
T060608D	0.89098	T061201N	0.89944	T061631M	0.88394
T060608M	0.98679	T061201M	0.97288	T061641M	0.90154
T060609B	0.94387	T061301B	0.92181	T061651M	0.91183
T060609C	0.94775	T061301C	0.92146	T061701B	0.87908
T060609D	0.90733	T061301D	0.88518	T061701C	0.87702
T060609M	0.98983	T061301E	0.87885	T061701D	0.87003
T060610B	0.91969	T061302B	0.89660	T061701E	0.86902
T060610C	0.93803	T061302C	0.89068	T061701M	0.93701
T060610D	0.92345	T061302D	0.89932	T061801B	0.89685

Table C-14 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 8

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
T061801C	0.82298	T062401D	0.83843		
T061801D	0.82136	T062401E	0.87456		
T061801E	0.87751	T062401M	0.89555		
T061801M	0.88743	C034201B	0.93437		
T061901B	0.97672	C034201C	0.95508		
T061901C	0.89348	C034402N	0.91768		
T061901M	0.95575	C034401N	0.92105		
T062001B	0.92394	C034510D	0.88851		
T062001C	0.91700	C034514B	0.91214		
T062001D	0.90789	C039401M	0.90840		
T062001M	0.92574	C039501M	0.88955		
T062002B	0.91343	T062501E	0.93702		
T062002C	0.88801	T062601B	0.88934		
T062002D	0.89329	T062601C	0.90431		
T062002M	0.92914	T062801N	0.90888		
T062003B	0.91379	NATLUNCL	0.93080		
T062003C	0.91518	REMREADL	0.95036		
T062003D	0.89893	REMMATHL	0.93477		
T062003M	0.92391	NATLUN8L	0.95035		
T062101B	0.88537	REMREA8L	0.94179		
T062101C	0.91298	REMMAT8L	0.91575		
T062101D	0.91918				
T062101M	0.94411				
T062201M	0.88523				
T062202M	0.90225				
T062203M	0.87435				
T062204M	0.87554				
T062205M	0.91436				
T062206M	0.90197				
T062207M	0.90015				
T062208M	0.88440				
T062209M	0.87189				
T062210M	0.88852				
T062301B	0.87946				
T062301C	0.91774				
T062301D	0.92148				
T062301E	0.89088				
T062301M	0.96040				
T062401B	0.84979				
T062401C	0.87496				

Table C-15

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
FEMALE	0.92370	B007302M	0.89368	R/T 42	0.90707
BLACK	0.91671	STGRD1-2	0.93694	R/T 43	0.90569
HISPANIC	0.96148	STGRD3-5	0.93985	R/T 44	0.89637
ASIAN	0.93361	STGRD6>	0.93795	R/T 45	0.94571
MEXICAN	0.92939	DIS@HOM2	0.89580	R/P 24	0.89406
PUER RIC	0.97662	DIS@HOM3	0.92398	R/P 25	0.90413
CUBN,OTH	0.94184	DIS@HOM4	0.85025	R/P 31	0.89725
HISP-?	0.92808	1-2 WEEK	0.95179	R/P 32	0.84060
NON MSA	0.91456	1-2 MTH	0.95974	R/P 33	0.89209
MID CTY5	0.93434	NEVER	0.96102	R/P 34	0.90020
FR/BTWN5	0.94074	NO COMP	0.93694	R/P 35	0.90331
SML TWN5	0.95555	MISSING	0.86829	R/P 41	0.85040
RURAL5	0.94797	PGS>5	0.83576	R/P 42	0.93317
URBAN FR	0.90644	PGS>10	0.83543	R/P 43	0.94337
MED CITY	0.85799	ACADEMIC	0.74011	R/P 44	0.93201
SM PLACE	0.91587	VOC/TECH	0.88858	R/P 45	0.85683
HS GRAD	0.93832	OTHERPGM	0.93125	R/S 31	0.96840
POST HS	0.94431	HS PGM-?	0.87703	R/S 32	0.94832
COL GRAD	0.94447	SEMENG-^	0.85785	R/S 33	0.96108
PARED-?	0.95349	#ENG-LIN	0.86187	R/S 41	0.91717
S EAST	0.87537	SEMMAT-^	0.89980	R/S 42	0.97077
CENTRAL	0.87869	#MAT-LIN	0.85762	R/S 43	0.96034
WEST	0.89809	SEMSCI-^	0.94353	T/P 25	0.78555
PRIVATE	0.90600	SEMSCI-^	0.94391	T/P 31	0.77884
CATHOLIC	0.91113	SEMSCI-^	0.92937	T/P 32	0.80087
IEP-NO	0.96858	SEMSCI-^	0.94424	T/P 33	0.85271
LEP-NO	0.84055	#SCI-LIN	0.94928	T/P 34	0.80212
CHAP1-N	0.80994	SEMHIS-^	0.87145	T/P 35	0.77866
REDUCED	0.96889	#HIS-LIN	0.81282	T/P 41	0.79150
FREE	0.81843	SEMFLG-^	0.87461	T/P 42	0.87999
INFO NA	0.84872	#FLG-LIN	0.73498	T/P 43	0.76779
SCH REF	0.88282	SEMVOC-^	0.83514	T/P 44	0.78170
HL-SOME	0.87173	#VOC-LIN	0.83192	T/P 45	0.81952
HL-ALWAY	0.79104	SEMART-^	0.85524	T/P 51	0.83260
HL-?	0.74483	#ART-LIN	0.84026	T/P 52	0.78216
TVLIN-0	0.97823	G/R 22	0.90404	T/P 53	0.77941
TV-QUAD	0.97682	G/R 23	0.90937	T/P 54	0.82295
HW-NO	0.97714	G/R 24	0.94198	T/P 55	0.86631
HW-YES	0.97841	G/T 22	0.72103	T/S 32	0.93111
HWLIN-0	0.95670	G/T 23	0.73591	T/S 33	0.92985
HWQUAD-0	0.93911	G/T 24	0.73911	T/S 41	0.93703
HITEM=3	0.89323	G/T 25	0.75204	T/S 42	0.91521
HITEM=4	0.85631	G/P 22	0.88244	T/S 43	0.95788
MISS-2<	0.95667	G/P 23	0.93367	T/S 51	0.95006
USA >5	0.85566	G/P 24	0.84716	P/S 32	0.95860
USA 3-5	0.85481	G/P 25	0.87283	P/S 33	0.93211
USA <3	0.87402	G/S 22	0.93957	P/S 41	0.94838
USA-?	0.85582	G/S 23	0.93157	P/S 42	0.92213
SNRM-LIN	0.85074	R/T 24	0.86645	P/S 43	0.93854
B007302B	0.93970	R/T 25	0.88815	P/S 51	0.91858
B007302C	0.94259	R/T 31	0.88006	P/S 52	0.96626
B007302D	0.92964	R/T 32	0.90237	P/S 53	0.94966
B007302E	0.94782	R/T 33	0.87748	G/S 22	0.87359
B007302F	0.96231	R/T 34	0.88682		
B007302G	0.95909	R/T 35	0.89641		
B007302H	0.93841	R/T 41	0.91799		

Table C-15 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
G/S 23	0.85199	SAFE	0.83758	K811606D	0.96824
G/S 24	0.80521	UNSAFE	0.91634	K811606M	0.88656
R/S 24	0.84972	VRUNSAFE	0.89039	K811609B	0.88984
R/S 25	0.89377	MISSING	0.86977	K811609C	0.94882
R/S 31	0.88767	MOMHOM-N	0.79818	K811609D	0.90147
R/S 32	0.91324	MOMHOM-?	0.84249	K811609M	0.85823
R/S 33	0.83528	DADHOM-N	0.80065	K811610B	0.90043
R/S 34	0.88995	DADHOM-?	0.83309	K811610C	0.92427
R/S 35	0.90079	K811001B	0.87640	K811610D	0.79174
R/S 41	0.91950	K811001C	0.86949	K811610M	0.88371
R/S 42	0.92783	K811001M	0.96926	K811611B	0.97180
R/S 43	0.95621	K811002B	0.89254	K811611C	0.97730
R/S 44	0.94445	K811002C	0.85703	K811611D	0.97093
R/S 45	0.94598	K811002M	0.95790	K811611M	0.89673
P/S 25	0.84160	K811003B	0.81128	K811612B	0.94892
P/S 31	0.81919	K811003C	0.80332	K811612C	0.97547
P/S 32	0.82187	K811003M	0.91841	K811612D	0.96428
P/S 33	0.86127	K811004B	0.83191	K811612M	0.91000
P/S 34	0.80452	K811004C	0.79424	K811701B	0.96680
P/S 35	0.85549	K811004M	0.87589	K811701C	0.96952
P/S 41	0.86807	K811005B	0.89915	K811701D	0.81164
P/S 42	0.87586	K811005C	0.84462	K811701M	0.93645
P/S 43	0.84197	K811005M	0.93623	K811702B	0.87026
P/S 44	0.82647	K811006B	0.83533	K811702C	0.90906
P/S 45	0.82360	K811006C	0.80193	K811702D	0.87970
P/S 51	0.82931	K811006M	0.93241	K811702M	0.92286
P/S 52	0.88706	K811007B	0.88119	K811703B	0.92065
P/S 53	0.92145	K811007C	0.88794	K811703C	0.96463
P/S 54	0.92535	K811007M	0.92876	K811703D	0.89293
P/S 55	0.91986	K811008B	0.84982	K811703M	0.93180
T/S 25	0.82508	K811008C	0.81528	K811704B	0.86213
T/S 31	0.82858	K811008M	0.93534	K811704C	0.94034
T/S 32	0.80646	K811501N	0.83972	K811704D	0.88453
T/S 33	0.85515	K811501M	0.88107	K811704M	0.92997
T/S 34	0.82833	K811601B	0.91457	K811705B	0.92549
T/S 35	0.83691	K811601C	0.93836	K811705C	0.96879
T/S 41	0.76720	K811601D	0.86253	K811705D	0.94646
T/S 42	0.79785	K811601M	0.90577	K811705M	0.94342
T/S 43	0.78394	K811602B	0.96573	K811801B	0.95538
T/S 44	0.81266	K811602C	0.97587	K811801C	0.95294
T/S 45	0.81070	K811602D	0.96610	K811801M	0.91146
T/S 51	0.81065	K811602M	0.90736	K811901B	0.95389
T/S 52	0.84731	K811603B	0.95509	K811901C	0.94725
T/S 53	0.84975	K811603C	0.96497	K811901M	0.90236
T/S 54	0.85432	K811603D	0.94843	SM00101B	0.93541
T/S 55	0.84521	K811603M	0.86568	SM00101C	0.94607
S/S 23	0.94833	K811604B	0.86856	SM00101D	0.94310
S/S 24	0.93453	K811604C	0.92230	SM00101M	0.93669
S/S 25	0.91953	K811604D	0.82110	SM00201B	0.94988
S/S 31	0.90401	K811604M	0.80114	SM00201C	0.94372
S/S 32	0.92777	K811605B	0.96389	SM00201D	0.93606
S/S 33	0.90733	K811605C	0.97974	SM00201M	0.92801
S/S 34	0.90341	K811605D	0.97665	SM00301B	0.96646
S/S 35	0.89551	K811605M	0.90457	SM00301C	0.95724
B008901N	0.96035	K811606B	0.95720	SM00301D	0.94827
B008901M	0.73193	K811606C	0.97895	SM00301M	0.95431

Table C-15 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
SM00401B	0.93849	LABORER	0.97106	K812505D	0.91924
SM00401C	0.95563	OPERATOR	0.97540	K812505M	0.81853
SM00401D	0.94106	FARMER	0.97340	K812506B	0.93685
SM00401M	0.95862	HOMEMAKE	0.84191	K812506C	0.96164
SM00501B	0.89908	MANAGER	0.97479	K812506D	0.91692
SM00501C	0.91708	MILITARY	0.95518	K812506M	0.81541
SM00501D	0.86213	TEACHER	0.93503	K812507B	0.95634
SM00501M	0.94235	PROFESS1	0.94833	K812507C	0.93825
B009601B	0.96681	PROFESS2	0.96191	K812507D	0.92636
B009601N	0.82588	B011A01N	0.83488	K812507M	0.75786
B009601D	0.82668	OFFICE	0.97489	K812508B	0.95876
B009601E	0.91039	TECHNIC	0.96958	K812508C	0.94943
B009602B	0.97020	PROT SRV	0.97817	K812508D	0.92637
B009602N	0.91670	SALES	0.97251	K812508M	0.92681
B009602D	0.81088	OWNER	0.93699	K812509B	0.96423
B009602M	0.89009	SERV WRK	0.97771	K812509C	0.94068
K812201B	0.95074	SKILL TR	0.95835	K812509D	0.93203
K812201C	0.95852	LABORER	0.96193	K812509M	0.92891
K812201D	0.96820	OPERATOR	0.96862	K812510B	0.95701
K812201E	0.95870	FARMER	0.96916	K812510C	0.97071
K812201F	0.96426	HOMEMAKE	0.92559	K812510D	0.90151
K812201G	0.92004	MANAGER	0.95432	K812510M	0.81960
K812201M	0.76695	MILITARY	0.97175	K812601N	0.76508
K811613B	0.78967	TEACHER	0.96287	K812601M	0.85884
K811613C	0.81480	PROFESS1	0.95270	K812701N	0.94118
K811613D	0.81977	PROFESS2	0.95053	K812701M	0.72392
K811613M	0.90693	B012A02N	0.80717	K811616B	0.88195
K811614B	0.80434	K812301M	0.68403	K811616C	0.95726
K811614C	0.83632	K812302M	0.72750	K811616D	0.86971
K811614D	0.81649	K812303M	0.70247	K811616M	0.90145
K811614M	0.92128	K812304M	0.77563	C035701N	0.87089
K811615B	0.95715	K812305M	0.70288	C035701M	0.93561
K811615C	0.96735	K812306M	0.67864	C035702N	0.88353
K811615D	0.95802	K812307M	0.70809	C035702M	0.96946
K811615M	0.90318	K812308M	0.73819	C035703N	0.88092
B008301D	0.91047	K812309M	0.90994	C035703M	0.90409
B008301M	0.85479	K812401N	0.87571	C037201M	0.92494
B009901B	0.90169	K812401M	0.73201	C037202M	0.91093
B009901C	0.88406	K812501B	0.93090	C037204M	0.88947
B009901D	0.95840	K812501C	0.94349	C037205M	0.88924
B009901E	0.96738	K812501D	0.87892	C037206M	0.88132
B009901F	0.93242	K812501M	0.79450	C037301M	0.97333
B009901M	0.82910	K812502B	0.95817	C037302M	0.96547
B005501B	0.95315	K812502C	0.93269	C037304M	0.86899
B005501C	0.95268	K812502D	0.92930	C037305M	0.91604
B005501D	0.90958	K812502M	0.77542	C036601B	0.89973
B005501E	0.96631	K812503B	0.83251	C036601C	0.90271
B005501F	0.96104	K812503C	0.90384	C036601D	0.94276
B005501M	0.89563	K812503D	0.89370	C036601M	0.97157
OFFICE W	0.93957	K812503M	0.73458	C032207B	0.92786
TECHNIC	0.96790	K812504B	0.96720	C032207N	0.92407
PROT SRV	0.97745	K812504C	0.93237	C032207M	0.92511
SALES	0.97623	K812504D	0.90946	C032209B	0.91965
OWNER	0.96605	K812504M	0.75624	C032209N	0.92544
SERV WRK	0.96570	K812505B	0.93971	C032209M	0.95453
SKILL T	0.96972	K812505C	0.96015	C032210B	0.94360

Table C-15 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance
C032210N	0.95198
C032210M	0.93908
C032211B	0.88500
C032211N	0.89029
C032211M	0.95735
C037701B	0.86986
C037701C	0.90194
C037701D	0.88184
C037701M	0.96339
C037702B	0.89756
C037702C	0.91838
C037702D	0.90530
C037702M	0.98220
C037703B	0.89745
C037703C	0.92208
C037703D	0.90642
C037704B	0.88329
C037704C	0.87431
C037704D	0.90198
C037704M	0.96324
C037705B	0.89701
C037705C	0.89818
C037705D	0.90113
C032402B	0.93144
C032402C	0.93392
C032402D	0.91518
C032402M	0.99407
C032401B	0.91072
C032401C	0.94322
C032401D	0.89027
C032404B	0.89397
C032404C	0.94549
C032404D	0.91661
C032406B	0.89388
C032406C	0.95032
C032406D	0.94029
C032407B	0.88643
C032407C	0.86886
C032408B	0.89443
C032408C	0.96359
C032408D	0.95832
C032409B	0.92367
C032409C	0.93134
C032409D	0.91390
C032410B	0.91959
C032410C	0.93374
C032410D	0.90272
C032410M	0.98139
C032411B	0.93842
C032411C	0.94358
C032411D	0.88421
C032412B	0.93187
C032412C	0.93695
C032412D	0.91771
C032413B	0.90251
C032413C	0.94961
C032413D	0.95037
C032414B	0.91331
C032414C	0.94297
C032414D	0.88909
C032415B	0.92753
C032415C	0.95380
C032415D	0.92709
C032502B	0.90890
C032502C	0.90013
C032502D	0.90145
C032502M	0.96764
C032503B	0.89695
C032503C	0.92592
C032505B	0.90278
C032505C	0.90078
C032505D	0.91001
C032506B	0.89881
C032506C	0.87640
C032506D	0.86800
C033601B	0.92369
C033601C	0.93328
C033601D	0.91139
C033601M	0.97710
C036501B	0.90250
C036501C	0.89498
C036501M	0.97172
C037801B	0.89545
C037801C	0.90352
C037801D	0.90447
C037801E	0.91240
C037801F	0.90460
C037801G	0.89732
C038001B	0.85284
C038001C	0.87525
C038001D	0.91860
C038001M	0.98010
C038301N	0.87718
C038301M	0.91358
C038801N	0.90183
C038801M	0.89507
C034101M	0.88584
C034102M	0.90191
C034103M	0.87030
C034104M	0.88278
C034105M	0.87628
C034106M	0.87212
C034107M	0.88182
C034108M	0.90287
C034109M	0.89353
C037203M	0.90966
C037306M	0.96368
C035002N	0.93660
C035002M	0.97875
C035003N	0.92974
C035003M	0.97412
C035006N	0.87744
C035006M	0.98034
C035007N	0.88632
C035007M	0.95328
C040201C	0.88300
C040201D	0.94551
C040201E	0.94396
C040201F	0.89375
C040202C	0.89626
C040202D	0.95294
C040202E	0.93950
C040202F	0.87251
C040203E	0.93462
C040203F	0.94699
C040204B	0.87484
C040204C	0.88743
C040204D	0.88296
C040204F	0.91571
C040204M	0.95036
C040301M	0.92424
C040302M	0.88503
C040303M	0.88238
C040304M	0.91496
C040305M	0.86109
C040306M	0.89956
C040307M	0.84836
C040308M	0.88209
C040309M	0.86589
C040310M	0.88911
C040311M	0.90474
C040401N	0.94208
C040402N	0.92615
C040402M	0.94019
C040403N	0.94880
C040404N	0.93593
C040501M	0.88498
C040502M	0.87825
C040503M	0.88078
C040504M	0.90028
C040505M	0.84857
C040506M	0.89174
C040601M	0.87994
C040602M	0.86801
C040603M	0.88405
C040604M	0.88632
C040605M	0.85646
C040701M	0.93398
C040702M	0.90968
C040703M	0.89486
C040704M	0.88840
C040705M	0.91671
C040801B	0.89025
C040801C	0.88122

Table C-15 (continued)

Proportion of Variance of the Conditioning Variable Contrasts Accounted for by the Principal Components Used in the Conditioning Model for Science Main Conditioning Variables, Grade 12

Contrast	Proportion of Variance	Contrast	Proportion of Variance	Contrast	Proportion of Variance
C040801D	0.89810	NATLUNCH	0.89537		
C040801E	0.89719	NATLUNCL	0.88462		
C040801M	0.88578	REM READ	0.86228		
C040802B	0.89384				
C040802C	0.88248				

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Appendix D

IRT PARAMETERS

This appendix contains tables of IRT (item response theory) parameters for NAEP items that were scaled in each subject area and study (main and long-term trend) for which IRT scales were created.

For each of the binary scored items used in scaling (i.e., multiple-choice items and short constructed-response items), the tables provide estimates of the IRT parameters (which correspond to a_j, b_j, and c_j in Equation 11.1 in Chapter 11) and their associated standard errors (s.e.) of the estimates. For each of the polytomously scored items (i.e., the extended constructed-response items), the tables also show the estimates of the d_{jv} parameters (see Equation 11.3) and their associated standard errors.

For the main assessment items, the tables also show the block in which each item appears for each age class (*Block*) and the position of each item within its block (*Item*).

Note that item parameters shown in this appendix are in the metrics used for the original calibration of the scales. The transformations needed to represent these parameters in terms of the metric of the final reporting scales are given in Chapters 12 through 18.

Table D-1
IRT Parameters for the 1996 Mathematics Main Samples
Number Sense, Properties, and Operations, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1M010131	MH	2A	0.461 (0.037)	-1.996 (0.220)	0.210 (0.058)				
1M010231	MH	3A	0.556 (0.044)	-0.586 (0.155)	0.197 (0.048)				
1M010431	MH	5A	0.711 (0.065)	0.194 (0.106)	0.228 (0.036)				
1M010531	MH	6A	0.569 (0.078)	1.387 (0.130)	0.128 (0.029)				
1M010631	MH	7A	0.295 (0.025)	-2.058 (0.177)	0.000 (0.000)				
1M010831	MH	9A	1.005 (0.068)	0.095 (0.058)	0.172 (0.024)				
1M011131	MH	13A	0.872 (0.062)	-0.053 (0.075)	0.171 (0.030)				
1M017401	MD	1	0.359 (0.037)	-3.271 (0.365)	0.209 (0.058)				
1M017701	MD	4	0.961 (0.074)	0.438 (0.056)	0.170 (0.022)				
1M017901	MD	6	1.383 (0.087)	0.539 (0.032)	0.115 (0.013)				
1M018201	MD	9	1.052 (0.102)	1.297 (0.056)	0.163 (0.014)				
1M018401	MD	11	1.414 (0.113)	0.767 (0.039)	0.223 (0.015)				
1M018501	MD	12	0.738 (0.210)	3.443 (0.488)	0.231 (0.012)				
1M018601	MD	13	0.740 (0.120)	2.359 (0.172)	0.145 (0.014)				
1M020001	MF	4A	1.159 (0.042)	-0.185 (0.024)	0.000 (0.000)				
1M020101	MF	5A	0.934 (0.044)	1.301 (0.046)	0.000 (0.000)				
1M020501	MF	9A	0.678 (0.034)	1.030 (0.051)	0.000 (0.000)				
1M039001	MC	1	0.766 (0.050)	-1.617 (0.130)	0.209 (0.054)				
1M039201	MC	3A	0.792 (0.032)	-0.217 (0.032)	0.000 (0.000)				
1M039901	MC	10	0.899 (0.095)	1.694 (0.076)	0.134 (0.013)				
1M040201	MC	13A	1.005 (0.055)	1.632 (0.057)	0.000 (0.000)				
1M040301	MI	1A	0.647 (0.029)	0.116 (0.037)	0.000 (0.000)				
1M040701	MI	5	0.671 (0.069)	0.629 (0.101)	0.231 (0.032)				
1M040901	MI	7A	1.412 (0.053)	0.422 (0.022)	0.000 (0.000)				
1M042601	MM	1	0.830 (0.060)	-0.445 (0.100)	0.221 (0.040)				
1M042901	MM	4	0.603 (0.068)	0.831 (0.109)	0.211 (0.033)				
1M043001	MM	5	0.690 (0.047)	-0.870 (0.126)	0.204 (0.048)				
1M043301	MM	8A	0.781 (0.034)	0.738 (0.038)	0.000 (0.000)				
1M046001	MK	1A	0.658 (0.031)	-1.104 (0.053)	0.000 (0.000)				
1M046301	MK	4	1.175 (0.089)	0.609 (0.044)	0.196 (0.017)				
1M046501	MK	6	0.684 (0.100)	1.454 (0.107)	0.303 (0.025)				
1M046801	MK	9A	1.035 (0.041)	0.616 (0.029)	0.000 (0.000)				
1M046901	MK	10A	0.919 (0.037)	0.425 (0.030)	0.000 (0.000)				
1M047501	MK	16	0.511 (0.043)	-0.750 (0.183)	0.210 (0.053)				
1M066101	ME	2	0.791 (0.065)	-0.877 (0.123)	0.190 (0.048)				
1M066401	ME	5	0.793 (0.120)	1.508 (0.110)	0.194 (0.024)				
1M066701	ME	8A	0.731 (0.031)	-0.114 (0.032)	0.000 (0.000)	-0.187 (0.064)	0.187 (0.061)		
1M066801	ME	9A	0.470 (0.018)	0.108 (0.042)	0.000 (0.000)	-2.287 (0.149)	2.287 (0.149)		
1M067801	MG	3	1.937 (0.167)	1.001 (0.040)	0.186 (0.014)				
1M068001	MG	5A	0.731 (0.046)	0.713 (0.055)	0.000 (0.000)				
1M068002	MG	6A	0.710 (0.032)	0.544 (0.034)	0.000 (0.000)	-0.140 (0.061)	0.140 (0.067)		
1M068301	ML	1A	1.192 (0.101)	-0.173 (0.071)	0.185 (0.032)				
1M068401	ML	2A	0.889 (0.085)	0.191 (0.086)	0.173 (0.033)				
1M068501	ML	3A	1.177 (0.103)	0.369 (0.055)	0.143 (0.023)				

Table D-1 (continued)

IRT Parameters for the 1996 Mathematics Main Samples
Number Sense, Properties, and Operations, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1M068701	ML	5A	0.484 (0.029)	-1.148 (0.064)	0.000 (0.000)	0.878 (0.110)	-0.878 (0.071)		
1M068801	ML	6A	1.547 (0.174)	0.698 (0.054)	0.287 (0.021)				
1M068901	ML	7A	0.737 (0.037)	0.974 (0.041)	0.000 (0.000)	-0.058 (0.059)	0.058 (0.075)		
1M071901	MN	1A	0.824 (0.103)	0.481 (0.109)	0.247 (0.038)				
1M072001	MN	2A	0.590 (0.062)	-0.140 (0.155)	0.191 (0.048)				
1M072401	MN	7A	0.746 (0.038)	0.455 (0.034)	0.000 (0.000)	0.253 (0.054)	-0.253 (0.061)		
1M072501	MN	8A	0.744 (0.043)	1.431 (0.058)	0.000 (0.000)	-0.145 (0.070)	0.145 (0.099)		
1M072601	MN	9A	0.548 (0.031)	1.550 (0.077)	0.000 (0.000)	-1.186 (0.129)	1.186 (0.158)		
1M074601	MO	5	0.793 (0.130)	0.962 (0.126)	0.359 (0.034)				
1M074701	MO	6A	1.014 (0.054)	-0.387 (0.040)	0.000 (0.000)				
1M075001	MO	9A	0.693 (0.033)	1.463 (0.055)	0.000 (0.000)	-0.952 (0.096)	0.952 (0.117)		
1M075101	MO	10A	0.563 (0.024)	0.693 (0.035)	0.000 (0.000)	1.946 (0.079)	-0.362 (0.079)	-1.007 (0.122)	-0.577 (0.152)
1N202831	MH	12A	0.749 (0.068)	-0.345 (0.140)	0.289 (0.048)				
1N240031	MH	14A	1.413 (0.094)	0.368 (0.037)	0.146 (0.017)				
1N277903	MF	10A	0.529 (0.031)	-1.535 (0.086)	0.000 (0.000)				

Table D-2

IRT Parameters for the 1996 Mathematics Main Samples
Measurement, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
2M010731	MH	8A	1.316 (0.104)	0.695 (0.043)	0.241 (0.017)				
2M010931	MH	10A	0.737 (0.081)	1.176 (0.079)	0.191 (0.023)				
2M017501	MD	2	0.545 (0.037)	-1.365 (0.144)	0.143 (0.045)				
2M018101	MD	8	0.799 (0.068)	0.777 (0.064)	0.150 (0.022)				
2M020301	MF	7A	1.002 (0.044)	1.054 (0.037)	0.000 (0.000)				
2M039101	MC	2	0.493 (0.036)	-1.277 (0.173)	0.162 (0.050)				
2M039301	MC	4A	0.824 (0.036)	0.778 (0.037)	0.000 (0.000)				
2M039401	MC	5	0.821 (0.056)	-0.194 (0.079)	0.164 (0.032)				
2M039501	MC	6	0.826 (0.052)	-0.285 (0.074)	0.139 (0.030)				
2M039601	MC	7	0.634 (0.049)	0.689 (0.072)	0.093 (0.023)				
2M040461	MI	2D	0.444 (0.011)	-1.026 (0.031)	0.000 (0.000)	-0.822 (0.101)	-1.911 (0.147)	2.733 (0.128)	
2M040801	MI	6	1.123 (0.143)	1.277 (0.075)	0.192 (0.020)				
2M041001	MI	8	1.951 (0.164)	1.142 (0.042)	0.132 (0.012)				
2M042701	MM	2	0.962 (0.055)	-1.511 (0.085)	0.135 (0.040)				
2M042801	MM	3	0.818 (0.048)	-1.649 (0.104)	0.143 (0.044)				
2M047101	MK	12	1.341 (0.130)	2.046 (0.086)	0.197 (0.009)				
2M047201	MK	13	1.086 (0.088)	0.840 (0.048)	0.182 (0.017)				
2M061906	MJ	6A	1.113 (0.077)	2.228 (0.091)	0.000 (0.000)				
2M066001	ME	1	0.698 (0.088)	1.070 (0.100)	0.145 (0.028)				
2M067601	MG	1	0.599 (0.079)	1.256 (0.119)	0.118 (0.028)				
2M069001	ML	8A	0.730 (0.043)	1.453 (0.054)	0.000 (0.000)	0.881 (0.053)	-0.881 (0.106)		
2M072101	MN	3A	0.779 (0.065)	-1.898 (0.151)	0.157 (0.050)				
2M074201	MO	1	1.037 (0.077)	-0.018 (0.057)	0.090 (0.023)				
2M074301	MO	2A	1.026 (0.056)	-0.098 (0.037)	0.000 (0.000)				
2M074801	MO	7A	0.598 (0.030)	0.431 (0.038)	0.000 (0.000)	-0.012 (0.067)	0.012 (0.073)		

Table D-3

IRT Parameters for the 1996 Mathematics Main Samples

Geometry and Spatial Sense, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
3M011231	MH	15A	0.916 (0.191)	2.496 (0.207)	0.248 (0.014)				
3M017601	MD	3	0.307 (0.032)	-0.719 (0.269)	0.254 (0.048)				
3M018001	MD	7	1.056 (0.123)	1.472 (0.068)	0.235 (0.015)				
3M019801	MF	2A	0.443 (0.037)	3.009 (0.220)	0.000 (0.000)				
3M019901	MF	3A	0.625 (0.029)	-0.812 (0.048)	0.000 (0.000)				
3M020701	MF	11A	0.452 (0.031)	1.382 (0.093)	0.000 (0.000)				
3M039801	MC	9	0.928 (0.152)	1.817 (0.115)	0.366 (0.016)				
3M041201	MI	10A	0.382 (0.021)	0.699 (0.048)	0.000 (0.000)	1.078 (0.107)	0.351 (0.105)	-1.429 (0.143)	
3M043401	MM	9A	2.082 (0.077)	0.260 (0.016)	0.000 (0.000)				
3M043402	MM	10A	1.838 (0.069)	0.442 (0.018)	0.000 (0.000)				
3M043403	MM	11A	1.125 (0.069)	1.970 (0.073)	0.000 (0.000)				
3M046101	MK	2	0.478 (0.040)	-1.317 (0.222)	0.242 (0.060)				
3M046201	MK	3	1.058 (0.079)	0.571 (0.047)	0.171 (0.019)				
3M046401	MK	5	0.837 (0.062)	0.226 (0.070)	0.178 (0.027)				
3M046701	MK	8	0.569 (0.078)	1.564 (0.114)	0.186 (0.027)				
3M047401	MK	15	0.932 (0.066)	-1.921 (0.123)	0.219 (0.054)				
3M061901	MJ	1A	0.594 (0.029)	-0.292 (0.042)	0.000 (0.000)				
3M061902	MJ	2A	1.657 (0.060)	-0.144 (0.019)	0.000 (0.000)				
3M061903	MJ	3A	1.781 (0.067)	-0.516 (0.020)	0.000 (0.000)				
3M061904	MJ	4A	0.870 (0.046)	1.581 (0.061)	0.000 (0.000)				
3M068003	MG	7A	1.015 (0.069)	0.978 (0.053)	0.000 (0.000)				
3M068004	MG	8A	0.200 (0.012)	1.696 (0.105)	0.000 (0.000)	-2.093 (0.252)	1.957 (0.305)	-0.262 (0.338)	0.398 (0.397)
3M074501	MO	4A	0.505 (0.030)	0.719 (0.051)	0.000 (0.000)	0.690 (0.070)	-0.690 (0.089)		
3M074901	MO	8A	0.580 (0.030)	0.906 (0.048)	0.000 (0.000)	-0.233 (0.072)	0.233 (0.089)		
3N214331	MH	1A	0.789 (0.057)	-2.195 (0.148)	0.223 (0.057)				

Table D-4

IRT Parameters for the 1996 Mathematics Main Samples
Data Analysis, Statistics, and Probabilties, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
4M017801	MD	5	0.726 (0.071)	0.720 (0.078)	0.196 (0.026)				
4M020201	MF	6A	0.910 (0.036)	-0.029 (0.028)	0.000 (0.000)				
4M040001	MC	11A	0.992 (0.039)	0.290 (0.026)	0.000 (0.000)				
4M040101	MC	12	0.777 (0.082)	0.448 (0.097)	0.322 (0.031)				
4M040601	MI	4	0.999 (0.063)	-0.038 (0.055)	0.147 (0.023)				
4M041101	MI	9	2.551 (0.132)	1.408 (0.033)	0.221 (0.009)				
4M043101	MM	6	1.533 (0.124)	0.654 (0.038)	0.299 (0.016)				
4M043201	MM	7A	0.672 (0.030)	-0.740 (0.044)	0.000 (0.000)				
4M046601	MK	7A	1.228 (0.049)	0.559 (0.024)	0.000 (0.000)				
4M047001	MK	11	1.756 (0.114)	1.449 (0.041)	0.154 (0.009)				
4M047301	MK	14A	1.178 (0.045)	-0.285 (0.026)	0.000 (0.000)				
4M061905	MJ	5A	0.890 (0.041)	0.811 (0.036)	0.000 (0.000)				
4M066901	ME	10A	0.282 (0.011)	0.785 (0.045)	0.000 (0.000)	-1.522 (0.168)	-2.244 (0.325)	2.747 (0.332)	1.019 (0.209)
4M068601	ML	4A	0.731 (0.071)	0.047 (0.107)	0.175 (0.037)				
4M069101	ML	9A	0.427 (0.018)	1.071 (0.040)	0.000 (0.000)	-1.993 (0.196)	3.473 (0.200)	-0.572 (0.127)	-0.909 (0.182)
4M072301	MN	6A	0.627 (0.077)	0.022 (0.166)	0.248 (0.050)				
4N250231	MH	11A	1.083 (0.080)	0.234 (0.054)	0.209 (0.023)				

Table D-5

IRT Parameters for the 1996 Mathematics Main Samples
Algebra and Functions, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
5M010331	MH	4A	0.741 (0.076)	0.295 (0.113)	0.310 (0.035)				
5M018301	MD	10	1.390 (0.119)	1.102 (0.038)	0.174 (0.012)				
5M018701	MD	14	1.052 (0.215)	2.723 (0.270)	0.184 (0.009)				
5M019701	MF	1A	0.653 (0.028)	-0.391 (0.039)	0.000 (0.000)				
5M020401	MF	8A	0.681 (0.030)	0.292 (0.036)	0.000 (0.000)				
5M039701	MC	8	1.396 (0.111)	1.245 (0.041)	0.204 (0.011)				
5M040501	MI	3	0.740 (0.064)	-0.125 (0.121)	0.274 (0.040)				
5M043501	MM	12A	0.343 (0.013)	1.058 (0.037)	0.000 (0.000)	0.903 (0.079)	-0.596 (0.106)	0.327 (0.128)	-0.635 (0.148)
5M066201	ME	3	1.626 (0.164)	0.478 (0.054)	0.305 (0.023)				
5M066301	ME	4A	0.443 (0.016)	-0.045 (0.042)	0.000 (0.000)	-2.434 (0.149)	2.434 (0.147)		
5M066501	ME	6A	0.678 (0.032)	0.997 (0.039)	0.000 (0.000)	-0.196 (0.063)	0.196 (0.075)		
5M066601	ME	7A	0.609 (0.032)	0.986 (0.045)	0.000 (0.000)	0.044 (0.064)	-0.044 (0.080)		
5M067701	MG	2	1.158 (0.111)	0.218 (0.075)	0.240 (0.031)				
5M067901	MG	4A	0.689 (0.029)	1.169 (0.039)	0.000 (0.000)	-1.324 (0.099)	1.324 (0.109)		
5M072201	MN	4A	0.417 (0.018)	-0.407 (0.047)	0.000 (0.000)	-5.308 (0.387)	5.308 (0.385)		
5M072202	MN	5A	0.763 (0.034)	0.803 (0.033)	0.000 (0.000)	-0.197 (0.058)	0.197 (0.066)		
5M072701	MN	10A	0.393 (0.030)	1.801 (0.101)	0.000 (0.000)	0.343 (0.116)	0.157 (0.168)	-0.500 (0.254)	
5M074401	MO	3	1.241 (0.146)	0.761 (0.065)	0.287 (0.024)				

Table D-6

IRT Parameters for the 1996 Mathematics Main Samples
Number Sense, Properties, and Operations, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1M011131	MH	13A	0.783 (0.057)	-1.197 (0.132)	0.251 (0.051)				
1M012431	MH	3A	0.960 (0.057)	-0.179 (0.056)	0.130 (0.025)				
1M012531	MH	4A	0.688 (0.049)	0.540 (0.063)	0.087 (0.022)				
1M012931	MH	8A	1.187 (0.104)	0.983 (0.046)	0.222 (0.016)				
1M013431	MH	15A	1.360 (0.087)	0.159 (0.041)	0.182 (0.020)				
1M013531	MH	16A	1.041 (0.121)	1.147 (0.070)	0.128 (0.020)				
1M013631	MH	17A	1.381 (0.086)	0.722 (0.032)	0.068 (0.011)				
1M017401	MD	1	0.252 (0.034)	-5.173 (0.727)	0.243 (0.063)				
1M017701	MD	4	1.016 (0.062)	-0.896 (0.078)	0.211 (0.036)				
1M017901	MD	6	1.386 (0.086)	-0.695 (0.057)	0.265 (0.030)				
1M018201	MD	9	0.595 (0.053)	-0.561 (0.141)	0.179 (0.043)				
1M018401	MD	11	1.003 (0.063)	-0.940 (0.084)	0.221 (0.038)				
1M018501	MD	12	1.538 (0.110)	0.550 (0.037)	0.273 (0.016)				
1M018601	MD	13	0.801 (0.064)	0.932 (0.056)	0.125 (0.018)				
1M020001	MF	4A	0.619 (0.028)	-0.446 (0.040)	0.000 (0.000)				
1M020101	MF	5A	1.258 (0.046)	-0.449 (0.024)	0.000 (0.000)				
1M020501	MF	9A	0.809 (0.032)	-0.314 (0.031)	0.000 (0.000)				
1M046001	MK	1A	0.364 (0.029)	-3.134 (0.237)	0.000 (0.000)				
1M046301	MK	4	0.870 (0.057)	-1.258 (0.113)	0.233 (0.047)				
1M046501	MK	6	0.933 (0.063)	-0.328 (0.078)	0.243 (0.032)				
1M046801	MK	9A	0.615 (0.030)	-1.250 (0.062)	0.000 (0.000)				
1M046901	MK	10A	0.948 (0.043)	-1.518 (0.052)	0.000 (0.000)				
1M049901	MC	1	0.806 (0.049)	-0.507 (0.079)	0.135 (0.032)				
1M050001	MC	2	1.422 (0.070)	-0.316 (0.034)	0.094 (0.018)				
1M050101	MC	3	0.947 (0.053)	0.310 (0.042)	0.073 (0.017)				
1M050301	MC	5	0.939 (0.088)	1.130 (0.055)	0.176 (0.017)				
1M051101	MC	13A	0.305 (0.019)	0.824 (0.061)	0.000 (0.000)	0.704 (0.122)	-0.724 (0.150)	0.020 (0.176)	
1M051201	MM	1A	0.636 (0.044)	-1.496 (0.096)	0.000 (0.000)				
1M051501	MM	4	1.037 (0.139)	1.726 (0.082)	0.211 (0.013)				
1M051601	MM	5A	0.676 (0.031)	-0.997 (0.049)	0.000 (0.000)				
1M051901	MM	8	1.970 (0.114)	0.709 (0.023)	0.097 (0.009)				
1M052401	MI	2A	0.861 (0.036)	0.738 (0.033)	0.000 (0.000)				
1M052901	MI	7A	0.608 (0.028)	-0.001 (0.038)	0.000 (0.000)				
1M053001	MI	8A	0.920 (0.040)	1.015 (0.037)	0.000 (0.000)				
1M066401	ME	5	0.535 (0.055)	-0.216 (0.165)	0.198 (0.046)				
1M067801	MG	3	0.851 (0.069)	-1.204 (0.126)	0.207 (0.048)				
1M069201	ML	1A	0.779 (0.093)	1.099 (0.085)	0.134 (0.025)				
1M069501	ML	4A	0.758 (0.073)	-0.270 (0.119)	0.182 (0.043)				
1M069601	ML	5A	0.626 (0.047)	1.477 (0.096)	0.000 (0.000)				
1M069901	ML	8A	0.784 (0.039)	1.238 (0.047)	0.000 (0.000)	-0.327 (0.068)	0.327 (0.088)		
1M073001	MN	3A	1.183 (0.093)	0.027 (0.057)	0.143 (0.027)				
1M073101	MN	4A	0.552 (0.082)	0.665 (0.170)	0.229 (0.048)				
1M073402	MN	7A	1.644 (0.145)	1.821 (0.072)	0.151 (0.010)				
1M073601	MN	9B	0.465 (0.023)	1.406 (0.057)	0.000 (0.000)	-0.148 (0.087)	-0.328 (0.140)	0.476 (0.165)	

Table D-6 (continued)

IRT Parameters for the 1996 Mathematics Main Samples

Number Sense, Properties, and Operations, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1M073602	MN	9A	0.559 (0.120)	1.140 (0.229)	0.422 (0.044)				
1M075901	MO	8A	0.561 (0.080)	0.916 (0.140)	0.153 (0.039)				
1N202831	MH	12A	0.671 (0.049)	-2.037 (0.173)	0.238 (0.059)				

Table D-7

IRT Parameters for the Mathematics Main Samples
Measurement, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)
2M012331	MH	2A	0.670 (0.043)	-1.615 (0.132)	0.171 (0.051)				
2M013331	MH	14A	0.931 (0.058)	-1.268 (0.097)	0.177 (0.048)				
2M017501	MD	2	0.348 (0.035)	-2.932 (0.353)	0.251 (0.062)				
2M018101	MD	8	0.543 (0.045)	-0.356 (0.160)	0.225 (0.047)				
2M019101	MD	18	1.147 (0.111)	1.695 (0.063)	0.152 (0.010)				
2M019201	MD	19	1.122 (0.113)	1.700 (0.063)	0.134 (0.010)				
2M020301	MF	7A	1.042 (0.038)	-0.406 (0.026)	0.000 (0.000)				
2M047101	MK	12	1.068 (0.068)	0.288 (0.048)	0.163 (0.020)				
2M047201	MK	13	0.831 (0.055)	-0.739 (0.104)	0.229 (0.043)				
2M047901	MK	18A	1.162 (0.057)	1.562 (0.045)	0.000 (0.000)				
2M050501	MC	7	0.766 (0.070)	0.331 (0.095)	0.261 (0.032)				
2M050901	MC	11A	0.795 (0.038)	1.353 (0.052)	0.000 (0.000)				
2M051301	MM	2A	0.464 (0.033)	-2.624 (0.164)	0.000 (0.000)				
2M052201	MM	11A	0.635 (0.022)	1.080 (0.028)	0.000 (0.000)	0.784 (0.040)	-0.502 (0.061)	-0.282 (0.082)	
2M052301	MI	1	1.528 (0.104)	0.761 (0.033)	0.181 (0.013)				
2M061907	MJ	5A	0.812 (0.036)	1.067 (0.043)	0.000 (0.000)				
2M061908	MJ	6A	0.753 (0.057)	2.720 (0.152)	0.000 (0.000)				
2M068008	MG	9A	0.331 (0.032)	2.700 (0.206)	0.000 (0.000)	0.611 (0.118)	-0.611 (0.236)		
2M069401	ML	3A	1.073 (0.081)	-0.849 (0.085)	0.160 (0.042)				
2M069701	ML	6A	0.745 (0.036)	1.228 (0.045)	0.000 (0.000)	-0.088 (0.059)	0.088 (0.079)		
2M069801	ML	7A	0.747 (0.099)	1.540 (0.102)	0.101 (0.021)				
2M072801	MN	1A	0.411 (0.049)	0.048 (0.219)	0.178 (0.052)				
2M073301	MN	6A	0.939 (0.121)	1.236 (0.078)	0.181 (0.022)				
2M075201	MO	1A	0.471 (0.050)	-0.523 (0.211)	0.190 (0.056)				
2M075401	MO	3A	0.627 (0.030)	0.222 (0.039)	0.000 (0.000)	0.944 (0.059)	-0.944 (0.064)		
2M075601	MO	5A	0.489 (0.019)	0.295 (0.039)	0.000 (0.000)	-1.164 (0.096)	1.164 (0.099)		
2M076001	MO	9A	0.435 (0.018)	1.556 (0.059)	0.000 (0.000)	-2.284 (0.172)	1.740 (0.208)	0.544 (0.176)	

Table D-8

IRT Parameters for the 1996 Mathematics Main Samples
Geometry and Spatial Sense, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
3M012731	MH	6A	0.553 (0.075)	1.612 (0.115)	0.160 (0.026)				
3M012831	MH	7A	1.100 (0.073)	0.509 (0.041)	0.133 (0.017)				
3M017601	MD	3	0.558 (0.046)	-1.228 (0.209)	0.313 (0.059)				
3M018001	MD	7	0.824 (0.072)	0.207 (0.090)	0.307 (0.030)				
3M019001	MD	17	0.789 (0.068)	0.853 (0.064)	0.164 (0.022)				
3M019601	MD	21	0.632 (0.071)	1.503 (0.091)	0.117 (0.021)				
3M019801	MF	2A	0.891 (0.035)	-0.760 (0.035)	0.000 (0.000)				
3M019901	MF	3A	0.636 (0.032)	-1.627 (0.073)	0.000 (0.000)				
3M020901	MF	11A	0.566 (0.028)	0.608 (0.045)	0.000 (0.000)				
3M021001	MF	12A	0.827 (0.033)	0.067 (0.029)	0.000 (0.000)				
3M021301	MF	15A	1.705 (0.062)	-0.075 (0.018)	0.000 (0.000)				
3M021302	MF	16A	1.454 (0.054)	-0.224 (0.021)	0.000 (0.000)				
3M046101	MK	2	0.750 (0.057)	-2.147 (0.183)	0.323 (0.066)				
3M046201	MK	3	1.211 (0.089)	-0.308 (0.069)	0.365 (0.029)				
3M046401	MK	5	0.814 (0.062)	-0.760 (0.125)	0.316 (0.045)				
3M046701	MK	8	1.276 (0.096)	0.271 (0.051)	0.328 (0.021)				
3M048001	MK	19A	1.124 (0.098)	1.487 (0.054)	0.081 (0.010)				
3M051001	MC	12A	0.660 (0.050)	1.422 (0.089)	0.000 (0.000)				
3M051801	MM	7	0.993 (0.128)	1.694 (0.081)	0.242 (0.014)				
3M052001	MM	9	0.857 (0.089)	1.417 (0.068)	0.172 (0.017)				
3M052601	MI	4	0.768 (0.062)	0.474 (0.072)	0.173 (0.026)				
3M061901	MJ	1A	0.619 (0.029)	-1.232 (0.059)	0.000 (0.000)				
3M061902	MJ	4A	1.366 (0.054)	-1.040 (0.030)	0.000 (0.000)				
3M061903	MJ	2A	1.247 (0.054)	-1.469 (0.040)	0.000 (0.000)				
3M061904	MJ	3A	0.848 (0.034)	0.148 (0.029)	0.000 (0.000)				
3M068003	MG	5A	0.552 (0.019)	-0.150 (0.034)	0.000 (0.000)	-1.993 (0.121)	1.993 (0.118)		
3M068005	MG	6A	0.426 (0.017)	-0.474 (0.047)	0.000 (0.000)	-1.640 (0.122)	1.640 (0.114)		
3M068006	MG	7A	0.479 (0.019)	0.717 (0.042)	0.000 (0.000)	-1.432 (0.103)	1.432 (0.111)		
3M068007	MG	8	0.758 (0.070)	0.490 (0.079)	0.110 (0.028)				
3M068201	MG	10A	0.248 (0.035)	1.970 (0.280)	0.000 (0.000)				
3M075801	MO	7A	0.982 (0.050)	0.988 (0.034)	0.000 (0.000)	0.287 (0.042)	-0.287 (0.058)		

Table D-9

IRT Parameters for the 1996 Mathematics Main Samples
Data Analysis, Statistics, and Probability, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
4M012631	MH	5A	1.294 (0.088)	0.484 (0.041)	0.209 (0.017)				
4M013031	MH	9A	1.127 (0.053)	1.368 (0.041)	0.000 (0.000)				
4M013131	MH	10A	0.900 (0.042)	1.259 (0.045)	0.000 (0.000)				
4M017801	MD	5	1.009 (0.062)	-0.620 (0.076)	0.209 (0.035)				
4M018901	MD	16	0.578 (0.114)	1.846 (0.172)	0.165 (0.030)				
4M020201	MF	6A	0.585 (0.033)	-2.087 (0.099)	0.000 (0.000)				
4M020801	MF	10A	1.006 (0.050)	1.553 (0.050)	0.000 (0.000)				
4M021101	MF	13A	0.928 (0.034)	0.034 (0.027)	0.000 (0.000)				
4M046601	MK	7A	1.002 (0.040)	-1.063 (0.036)	0.000 (0.000)				
4M047001	MK	11	0.968 (0.059)	0.049 (0.056)	0.147 (0.024)				
4M047301	MK	14A	0.976 (0.049)	-1.844 (0.061)	0.000 (0.000)				
4M047801	MK	17	1.486 (0.095)	0.770 (0.030)	0.117 (0.012)				
4M050261	MC	4E	0.763 (0.024)	-1.294 (0.033)	0.000 (0.000)	-0.389 (0.062)	0.389 (0.047)		
4M050401	MC	6	0.730 (0.056)	-0.145 (0.105)	0.208 (0.038)				
4M051401	MM	3	0.807 (0.046)	-1.074 (0.094)	0.155 (0.041)				
4M052701	MI	5	1.135 (0.078)	0.496 (0.046)	0.189 (0.018)				
4M052801	MI	6	0.545 (0.196)	4.612 (1.191)	0.179 (0.011)				
4M053101	MI	9A	0.664 (0.023)	1.289 (0.029)	0.000 (0.000)	0.221 (0.044)	0.151 (0.061)	-0.371 (0.081)	
4M061905	MJ	7A	0.484 (0.026)	-0.466 (0.052)	0.000 (0.000)				
4M067101	ME	2	1.092 (0.087)	-0.051 (0.069)	0.165 (0.029)				
4M067501	ME	11A	0.584 (0.030)	1.847 (0.058)	0.000 (0.000)	1.410 (0.057)	-1.410 (0.146)		
4M070001	ML	9A	0.227 (0.023)	1.216 (0.134)	0.000 (0.000)	0.412 (0.164)	-0.412 (0.201)		
4M072901	MN	2A	0.438 (0.019)	-0.542 (0.049)	0.000 (0.000)	-0.766 (0.105)	0.766 (0.093)		
4M0732CL	MN	5F	0.354 (0.020)	-0.326 (0.047)	0.000 (0.000)	1.065 (0.134)	-0.139 (0.112)	-0.926 (0.110)	
M073501	MN	8A	0.153 (0.029)	4.118 (0.770)	0.000 (0.000)				

Table D-10

IRT Parameters for the 1996 Mathematics Main Samples
Algebra and Functions, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
5M012231	MH	1A	0.611 (0.048)	-2.789 (0.198)	0.164 (0.053)				
5M013231	MH	11A	1.018 (0.099)	1.583 (0.062)	0.116 (0.012)				
5M013731	MH	18A	1.082 (0.104)	1.289 (0.056)	0.120 (0.014)				
5M018301	MD	10	0.928 (0.058)	-0.502 (0.078)	0.201 (0.034)				
5M018701	MD	14	1.535 (0.102)	0.231 (0.038)	0.265 (0.018)				
5M018801	MD	15	1.052 (0.093)	0.719 (0.058)	0.292 (0.020)				
5M019301	MD	20	1.413 (0.117)	1.048 (0.040)	0.195 (0.013)				
5M019701	MF	1A	0.435 (0.028)	-2.147 (0.129)	0.000 (0.000)				
5M020401	MF	8A	0.643 (0.028)	-0.287 (0.037)	0.000 (0.000)				
5M021201	MF	14A	0.960 (0.037)	0.355 (0.027)	0.000 (0.000)				
5M047601	MK	15	1.333 (0.075)	0.307 (0.033)	0.108 (0.015)				
5M047701	MK	16	0.977 (0.124)	1.682 (0.081)	0.239 (0.015)				
5M050601	MC	8	1.172 (0.068)	0.535 (0.034)	0.085 (0.013)				
5M050701	MC	9	1.655 (0.091)	0.032 (0.030)	0.141 (0.016)				
5M050801	MC	10A	0.792 (0.032)	-0.056 (0.031)	0.000 (0.000)				
5M051701	MM	6	1.448 (0.094)	0.460 (0.035)	0.196 (0.016)				
5M052101	MM	10A	0.879 (0.035)	0.374 (0.029)	0.000 (0.000)				
5M052501	MI	3	0.732 (0.067)	1.224 (0.066)	0.119 (0.019)				
5M066201	ME	3	1.058 (0.091)	-0.975 (0.109)	0.238 (0.050)				
5M066301	ME	4A	0.621 (0.052)	-2.180 (0.156)	0.000 (0.000)				
5M066501	ME	6A	0.566 (0.026)	-0.426 (0.040)	0.000 (0.000)	-0.195 (0.078)	0.195 (0.068)		
5M066601	ME	7A	0.381 (0.020)	-0.912 (0.068)	0.000 (0.000)	-0.594 (0.122)	0.594 (0.101)		
5M067001	ME	1	1.079 (0.113)	0.558 (0.075)	0.261 (0.028)				
5M067201	ME	8B	0.494 (0.019)	1.030 (0.047)	0.000 (0.000)	-1.990 (0.127)	1.990 (0.137)		
5M067202	ME	8A	1.361 (0.190)	0.924 (0.076)	0.422 (0.023)				
5M067301	ME	9	1.017 (0.092)	0.640 (0.062)	0.132 (0.024)				
5M067401	ME	10	0.887 (0.117)	1.333 (0.086)	0.163 (0.023)				
5M067701	MG	2	0.786 (0.065)	-1.318 (0.134)	0.206 (0.050)				
5M067901	MG	4A	0.637 (0.023)	-0.511 (0.034)	0.000 (0.000)	-1.335 (0.097)	1.335 (0.091)		
5M068101	MG	1	0.968 (0.073)	-0.601 (0.084)	0.144 (0.038)				
5M069301	ML	2A	0.683 (0.046)	1.256 (0.075)	0.000 (0.000)				
5M075301	MO	2A	1.196 (0.044)	-0.182 (0.029)	0.000 (0.000)	1.314 (0.047)	-1.314 (0.038)		
5M075501	MO	4A	1.139 (0.097)	0.310 (0.061)	0.166 (0.026)				
5M0757CL	MO	6E	0.541 (0.030)	0.282 (0.041)	0.000 (0.000)	0.473 (0.069)	-0.473 (0.074)		

Table D-11

IRT Parameters for the 1996 Mathematics Main Samples
Number Sense, Properties, and Operations, Grade 12

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1M011531	MH	15A	2.240 (0.111)	1.065 (0.024)	0.080 (0.007)				
1M012431	MH	3A	0.485 (0.038)	-2.457 (0.213)	0.168 (0.051)				
1M012531	MH	4A	0.617 (0.044)	-0.340 (0.107)	0.150 (0.037)				
1M012931	MH	8A	1.088 (0.077)	0.265 (0.054)	0.213 (0.023)				
1M017401	MD	1	0.307 (0.038)	-4.679 (0.589)	0.213 (0.059)				
1M017701	MD	4	0.933 (0.062)	-1.773 (0.110)	0.187 (0.046)				
1M017901	MD	6	1.197 (0.082)	-1.718 (0.091)	0.199 (0.044)				
1M018201	MD	9	0.583 (0.041)	-1.957 (0.163)	0.181 (0.049)				
1M018401	MD	11	0.994 (0.070)	-1.676 (0.114)	0.236 (0.050)				
1M018501	MD	12	1.441 (0.088)	-0.263 (0.046)	0.230 (0.025)				
1M018601	MD	13	0.507 (0.052)	0.631 (0.130)	0.184 (0.037)				
1M020501	MF	9A	0.915 (0.040)	-1.034 (0.041)	0.000 (0.000)				
1M021401	MF	1A	0.817 (0.034)	-0.367 (0.032)	0.000 (0.000)				
1M021701	MF	15A	1.205 (0.047)	0.357 (0.024)	0.000 (0.000)				
1M052401	MI	2A	0.522 (0.027)	-0.032 (0.044)	0.000 (0.000)				
1M056501	MC	8	1.314 (0.128)	1.215 (0.046)	0.216 (0.013)				
1M056601	MC	9	0.826 (0.074)	0.733 (0.069)	0.092 (0.022)				
1M056801	MC	10A	1.654 (0.066)	0.886 (0.023)	0.000 (0.000)				
1M057101	MC	14A	1.638 (0.111)	1.992 (0.063)	0.000 (0.000)				
1M058601	MK	2	1.165 (0.067)	-0.330 (0.052)	0.167 (0.026)				
1M059001	MK	5	0.925 (0.052)	0.151 (0.048)	0.095 (0.020)				
1M059201	MK	7	0.688 (0.043)	-1.359 (0.112)	0.146 (0.041)				
1M059601	MK	11	1.138 (0.085)	1.167 (0.042)	0.092 (0.011)				
1M060101	MM	3	0.579 (0.060)	0.680 (0.114)	0.194 (0.035)				
1M062101	MJ	7A	0.606 (0.031)	0.575 (0.045)	0.000 (0.000)				
1M069501	ML	4A	0.671 (0.059)	-0.978 (0.145)	0.179 (0.050)				
1M069601	ML	5A	0.759 (0.046)	1.905 (0.064)	0.000 (0.000)	0.796 (0.050)	-0.796 (0.125)		
1M070301	ML	7A	0.541 (0.102)	1.565 (0.176)	0.220 (0.038)				
1M070401	ML	8A	0.788 (0.039)	0.597 (0.034)	0.000 (0.000)	0.152 (0.053)	-0.152 (0.062)		
1M071201	ME	8A	0.436 (0.020)	0.938 (0.057)	0.000 (0.000)	-1.230 (0.113)	1.230 (0.128)		
1M071401	ME	10A	0.545 (0.032)	1.724 (0.088)	0.000 (0.000)	-0.996 (0.120)	0.996 (0.158)		
1M071503	MG	3	0.793 (0.079)	0.190 (0.104)	0.195 (0.038)				
1M073001	MN	3A	0.884 (0.074)	-1.189 (0.121)	0.185 (0.050)				
1M073101	MN	4A	0.469 (0.055)	-0.039 (0.202)	0.191 (0.053)				
1M073401	MN	7B	0.714 (0.032)	0.701 (0.035)	0.000 (0.000)	-0.096 (0.057)	0.096 (0.067)		
1M073701	MN	1A	0.797 (0.074)	-0.096 (0.110)	0.185 (0.042)				
1M074001	MN	9B	0.899 (0.048)	0.419 (0.032)	0.000 (0.000)	0.514 (0.049)	-0.514 (0.054)		
1M076101	MO	1A	0.500 (0.033)	-1.863 (0.091)	0.000 (0.000)	0.845 (0.148)	-0.845 (0.071)		
1M076201	MO	2A	0.526 (0.052)	-0.447 (0.165)	0.166 (0.048)				
1N202831	MH	12A	0.722 (0.054)	-2.341 (0.169)	0.205 (0.054)				

Table D-12

IRT Parameters for the 1996 Mathematics Main Samples
Measurement, Grade 12

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
2M011331	MH	13A	1.130 (0.078)	0.325 (0.048)	0.186 (0.020)				
2M011931	MH	19A	2.135 (0.118)	1.929 (0.048)	0.000 (0.000)				
2M012331	MH	2A	0.787 (0.052)	-2.078 (0.131)	0.176 (0.052)				
2M017501	MD	2	0.396 (0.040)	-3.260 (0.353)	0.260 (0.063)				
2M018101	MD	8	0.461 (0.038)	-1.102 (0.211)	0.240 (0.055)				
2M019101	MD	18	1.004 (0.086)	0.945 (0.051)	0.174 (0.017)				
2M019201	MD	19	1.164 (0.101)	1.100 (0.046)	0.173 (0.014)				
2M020301	MF	7A	1.014 (0.044)	-1.325 (0.043)	0.000 (0.000)				
2M052301	MI	1	1.619 (0.091)	0.086 (0.032)	0.152 (0.016)				
2M055801	MC	1	0.623 (0.042)	-1.952 (0.153)	0.174 (0.052)				
2M058501	MK	1	0.815 (0.050)	0.092 (0.060)	0.105 (0.023)				
2M059801	MK	14A	1.511 (0.102)	1.900 (0.060)	0.000 (0.000)				
2M060201	MM	4A	0.645 (0.032)	1.001 (0.052)	0.000 (0.000)				
2M060501	MM	7A	0.922 (0.041)	0.938 (0.037)	0.000 (0.000)				
2M061907	MJ	3A	0.850 (0.036)	0.668 (0.034)	0.000 (0.000)				
2M061908	MJ	4A	0.933 (0.050)	1.685 (0.062)	0.000 (0.000)				
2M069401	ML	3A	1.012 (0.079)	-1.446 (0.111)	0.173 (0.048)				
2M069701	ML	6A	0.494 (0.026)	0.440 (0.043)	0.000 (0.000)	-0.135 (0.078)	0.135 (0.085)		
2M071501	MG	1	1.100 (0.083)	-0.946 (0.087)	0.158 (0.039)				
2M071502	MG	2A	0.648 (0.024)	0.399 (0.031)	0.000 (0.000)	-1.168 (0.085)	1.168 (0.088)		
2M073301	MN	6A	0.692 (0.076)	-0.043 (0.136)	0.209 (0.045)				
2M073801	MN	2A	0.581 (0.021)	0.575 (0.034)	0.000 (0.000)	-1.724 (0.109)	1.724 (0.113)		
2M076901	MO	9A	0.537 (0.031)	1.968 (0.097)	0.000 (0.000)	-1.704 (0.157)	1.704 (0.192)		

Table D-13

IRT Parameters for the 1996 Mathematics Main Samples
Geometry and Spatial Sense, Grade 12

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
3M011731	MH	17A	1.435 (0.103)	0.357 (0.042)	0.234 (0.019)				
3M012731	MH	6A	1.015 (0.088)	0.100 (0.070)	0.172 (0.029)				
3M012831	MH	7A	1.569 (0.093)	-0.743 (0.048)	0.203 (0.027)				
3M017601	MD	3	0.676 (0.051)	-1.656 (0.185)	0.325 (0.062)				
3M018001	MD	7	0.963 (0.079)	-0.261 (0.096)	0.366 (0.034)				
3M019001	MD	17	0.897 (0.065)	-0.165 (0.081)	0.220 (0.032)				
3M020901	MF	11A	0.647 (0.029)	0.087 (0.037)	0.000 (0.000)				
3M021001	MF	12A	0.797 (0.034)	-1.083 (0.046)	0.000 (0.000)				
3M021801	MF	17A	1.359 (0.075)	1.387 (0.040)	0.000 (0.000)				
3M052601	MI	4	0.635 (0.051)	-0.073 (0.113)	0.188 (0.037)				
3M053301	MI	8A	1.368 (0.063)	1.214 (0.032)	0.000 (0.000)				
3M056001	MC	3	1.062 (0.059)	-0.672 (0.063)	0.155 (0.029)				
3M056701	MC	11	1.478 (0.106)	1.465 (0.044)	0.134 (0.009)				
3M058701	MK	3	1.317 (0.113)	-0.862 (0.088)	0.224 (0.042)				
3M058901	MK	4A	0.886 (0.035)	0.167 (0.029)	0.000 (0.000)				
3M059101	MK	6	1.073 (0.085)	0.211 (0.064)	0.308 (0.025)				
3M060001	MM	2A	1.465 (0.063)	1.071 (0.027)	0.000 (0.000)				
3M060601	MM	8A	1.124 (0.051)	1.096 (0.035)	0.000 (0.000)				
3M061901	MJ	1A	0.533 (0.031)	-2.017 (0.104)	0.000 (0.000)				
3M061904	MJ	2A	0.618 (0.028)	-0.316 (0.040)	0.000 (0.000)				
3M062401	MJ	10A	0.261 (0.016)	1.288 (0.090)	0.000 (0.000)	-0.319 (0.148)	-1.419 (0.239)	1.737 (0.264)	
3M070101	ML	1A	0.623 (0.111)	1.562 (0.147)	0.207 (0.032)				
3M071101	ME	7A	0.503 (0.021)	0.563 (0.040)	0.000 (0.000)	-1.284 (0.100)	1.284 (0.105)		
3M071301	ME	9A	1.178 (0.079)	1.495 (0.049)	0.000 (0.000)	0.119 (0.050)	-0.119 (0.083)		
3M073901	MN	8A	1.286 (0.083)	1.212 (0.046)	0.000 (0.000)				
3M076701	MO	7A	2.145 (0.124)	1.325 (0.023)	0.000 (0.000)	-0.012 (0.033)	0.012 (0.043)		
3M076801	MO	8A	0.989 (0.054)	1.512 (0.046)	0.000 (0.000)	-0.293 (0.060)	0.293 (0.084)		

Table D-14

IRT Parameters for the 1996 Mathematics Main Samples
Data Analysis, Statistics, and Probability, Grade 12

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
4M011631	MH	16A	0.618 (0.049)	-0.257 (0.112)	0.154 (0.037)				
4M012631	MH	5A	0.942 (0.063)	-0.875 (0.093)	0.215 (0.039)				
4M013031	MH	9A	0.821 (0.038)	0.673 (0.035)	0.000 (0.000)				
4M013131	MH	10A	0.604 (0.045)	0.667 (0.061)	0.000 (0.000)				
4M017801	MD	5	1.367 (0.093)	-1.082 (0.075)	0.298 (0.037)				
4M018901	MD	16	0.648 (0.116)	1.738 (0.166)	0.192 (0.028)				
4M020201	MF	6A	0.561 (0.036)	-2.785 (0.149)	0.000 (0.000)				
4M020801	MF	10A	0.874 (0.042)	0.930 (0.039)	0.000 (0.000)				
4M021101	MF	13A	0.783 (0.034)	-0.867 (0.044)	0.000 (0.000)				
4M021501	MF	2A	0.925 (0.052)	-0.412 (0.044)	0.000 (0.000)				
4M021502	MF	3A	0.887 (0.039)	-1.416 (0.051)	0.000 (0.000)				
4M052701	MI	5	0.915 (0.056)	-0.608 (0.073)	0.150 (0.031)				
4M052801	MI	6	0.196 (0.042)	5.485 (1.033)	0.156 (0.023)				
4M053401	MI	9A	0.278 (0.017)	0.678 (0.049)	0.000 (0.000)	1.029 (0.161)	0.260 (0.163)	0.245 (0.169)	-1.534 (0.210)
4M055901	MC	2	0.572 (0.041)	-0.954 (0.144)	0.169 (0.045)				
4M057001	MC	13A	1.341 (0.082)	1.625 (0.057)	0.000 (0.000)				
4M059701	MK	12	0.292 (0.058)	2.962 (0.415)	0.228 (0.032)				
4M059702	MK	13A	0.806 (0.046)	1.335 (0.059)	0.000 (0.000)				
4M059901	MM	1	0.702 (0.050)	-0.906 (0.123)	0.185 (0.044)				
4M060301	MM	5	0.505 (0.040)	-0.921 (0.169)	0.172 (0.048)				
4M060401	MM	6A	0.823 (0.035)	-0.481 (0.035)	0.000 (0.000)				
4M061905	MJ	5A	0.357 (0.034)	-1.159 (0.138)	0.000 (0.000)				
4M070201	ML	2A	0.477 (0.027)	0.988 (0.056)	0.000 (0.000)	1.018 (0.070)	-1.018 (0.100)		
4M0705CL	ML	9Z	0.564 (0.033)	1.037 (0.044)	0.000 (0.000)	0.413 (0.077)	0.377 (0.091)	-0.790 (0.129)	
4M070601	MI	10A	0.209 (0.022)	2.982 (0.263)	0.000 (0.000)	0.865 (0.184)	-0.217 (0.291)	-0.648 (0.489)	
4M070801	ME	4A	0.475 (0.023)	0.052 (0.041)	0.000 (0.000)	-0.436 (0.087)	0.436 (0.084)		
4M070901	ME	5A	1.038 (0.115)	0.844 (0.057)	0.125 (0.021)				
4M071601	MG	4	0.801 (0.084)	0.057 (0.100)	0.179 (0.037)				
4M071602	MG	5A	0.700 (0.033)	0.454 (0.031)	0.000 (0.000)	-0.221 (0.059)	0.221 (0.063)		
4M071603	MG	6A	2.084 (0.096)	0.197 (0.015)	0.000 (0.000)	0.271 (0.025)	-0.271 (0.022)		
4M071604	MG	7A	1.429 (0.057)	0.176 (0.019)	0.000 (0.000)	-0.177 (0.038)	0.177 (0.036)		
4M071801	MG	10A	0.295 (0.016)	1.118 (0.078)	0.000 (0.000)	1.791 (0.126)	-2.096 (0.187)	0.305 (0.245)	
4M0732CL	MN	5F	0.347 (0.022)	-1.385 (0.079)	0.000 (0.000)	0.789 (0.206)	0.024 (0.138)	-0.813 (0.100)	
4M076301	MO	3A	0.645 (0.081)	0.734 (0.106)	0.154 (0.034)				

Table D-15

IRT Parameters for the 1996 Mathematics Main Samples
Algebra and Functions, Grade 12

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
5M011431	MH	14A	1.382 (0.108)	0.714 (0.041)	0.247 (0.016)				
5M011831	MH	18A	1.786 (0.121)	1.446 (0.044)	0.201 (0.010)				
5M012031	MH	20A	1.136 (0.057)	0.859 (0.036)	0.000 (0.000)				
5M012131	MH	21A	1.654 (0.145)	1.275 (0.049)	0.152 (0.012)				
5M012231	MH	1A	0.532 (0.050)	-3.569 (0.298)	0.203 (0.057)				
5M013231	MH	11A	0.951 (0.074)	0.745 (0.051)	0.160 (0.019)				
5M018301	MD	10	0.720 (0.045)	-1.444 (0.122)	0.174 (0.047)				
5M018701	MD	14	1.191 (0.069)	-0.923 (0.065)	0.169 (0.033)				
5M018801	MD	15	0.997 (0.064)	-0.651 (0.080)	0.220 (0.035)				
5M019301	MD	20	2.071 (0.136)	0.183 (0.030)	0.242 (0.017)				
5M019401	MD	21	2.151 (0.136)	1.561 (0.045)	0.282 (0.010)				
5M019501	MD	22	1.562 (0.106)	1.346 (0.038)	0.090 (0.009)				
5M020401	MF	8A	0.609 (0.029)	-0.782 (0.049)	0.000 (0.000)				
5M021201	MF	14A	0.617 (0.030)	-0.796 (0.051)	0.000 (0.000)				
5M021601	MF	4A	1.518 (0.148)	2.105 (0.102)	0.000 (0.000)				
5M021602	MF	5A	1.833 (0.126)	1.514 (0.047)	0.000 (0.000)				
5M021702	MF	16A	0.748 (0.035)	-0.112 (0.036)	0.000 (0.000)				
5M052501	MI	3	1.273 (0.080)	0.015 (0.046)	0.213 (0.021)				
5M053201	MI	7	1.292 (0.101)	0.679 (0.044)	0.261 (0.017)				
5M056101	MC	4	1.101 (0.088)	0.551 (0.052)	0.253 (0.020)				
5M056201	MC	5	1.213 (0.104)	0.791 (0.048)	0.274 (0.017)				
5M056301	M	6	1.374 (0.069)	0.003 (0.031)	0.091 (0.015)				
5M056401	MC	7	1.123 (0.087)	0.447 (0.053)	0.270 (0.021)				
5M056901	MC	12A	1.906 (0.090)	1.336 (0.028)	0.000 (0.000)				
5M059301	MK	8	1.100 (0.078)	0.581 (0.045)	0.163 (0.018)				
5M059401	MK	9	2.647 (0.138)	0.831 (0.022)	0.200 (0.010)				
5M059501	MK	10	1.703 (0.151)	1.685 (0.067)	0.390 (0.010)				
5M060701	MM	9A	0.511 (0.029)	1.472 (0.052)	0.000 (0.000)	0.823 (0.075)	0.391 (0.094)	-1.214 (0.169)	
5M062001	MJ	6	0.994 (0.064)	-1.374 (0.102)	0.211 (0.047)				
5M062201	MJ	8	1.140 (0.088)	1.088 (0.042)	0.095 (0.012)				
5M062301	MJ	9	1.951 (0.108)	1.271 (0.031)	0.095 (0.007)				
5M070701	ME	1A	1.981 (0.186)	0.026 (0.047)	0.319 (0.026)				
5M070702	ME	2A	1.588 (0.130)	0.710 (0.038)	0.111 (0.015)				
5M070703	ME	3A	2.058 (0.198)	0.199 (0.044)	0.329 (0.024)				
5M071001	ME	6A	0.707 (0.032)	1.035 (0.041)	0.000 (0.000)	-0.429 (0.064)	0.429 (0.080)		
5M0717CL	MG	9	0.751 (0.033)	1.552 (0.043)	0.000 (0.000)	-0.848 (0.093)	-0.702 (0.220)	1.551 (0.220)	
5M074101	MN	10A	0.499 (0.024)	1.689 (0.066)	0.000 (0.000)	-1.272 (0.126)	0.274 (0.199)	0.998 (0.208)	
5M076401	MO	4A	1.384 (0.165)	1.481 (0.074)	0.223 (0.016)				
5M076501	MO	5A	0.841 (0.150)	1.822 (0.138)	0.169 (0.022)				
5M076601	MO	6A	1.057 (0.043)	0.920 (0.027)	0.000 (0.000)	-0.669 (0.062)	0.669 (0.068)		
5M077001	MO	10A	0.441 (0.043)	1.231 (0.122)	0.000 (0.000)				

Table D-16

IRT Parameters for the 1996 Science Main Samples
Physical Science, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1K031101	SD	1A	0.722 (0.044)	-1.320 (0.079)	0.000 (0.000)				
1K031102	SD	2A	0.469 (0.035)	-0.744 (0.084)	0.000 (0.000)				
1K031103	SD	3A	0.525 (0.038)	-0.012 (0.060)	0.000 (0.000)				
1K031104	SD	4A	0.788 (0.052)	-1.791 (0.098)	0.000 (0.000)				
1K031105	SD	5A	0.524 (0.080)	3.427 (0.450)	0.000 (0.000)				
1K031106	SD	6	0.649 (0.183)	2.495 (0.374)	0.172 (0.023)				
1K031107	SD	7A	0.576 (0.036)	1.527 (0.075)	0.000 (0.000)	-0.446 (0.081)	0.446 (0.114)		
1K031201	SE	1A	0.239 (0.011)	-0.516 (0.093)	0.000 (0.000)	2.650 (0.161)	-2.650 (0.140)		
1K031204	SE	4A	0.357 (0.019)	1.126 (0.053)	0.000 (0.000)	0.631 (0.097)	-0.456 (0.132)	-0.486 (0.185)	0.311 (0.212)
1K031210	SE	10A	0.686 (0.039)	0.143 (0.040)	0.000 (0.000)	0.744 (0.066)	-0.744 (0.063)		
1K031302	SF	7A	0.403 (0.059)	3.936 (0.467)	0.000 (0.000)	0.347 (0.137)	-0.347 (0.450)		
1K031303	SF	8A	0.700 (0.042)	-0.449 (0.046)	0.000 (0.000)	0.678 (0.082)	-0.678 (0.057)		
1K031304	SF	9A	0.476 (0.037)	-1.076 (0.094)	0.000 (0.000)	0.380 (0.142)	-0.380 (0.092)		
1K031309	SF	6G	0.366 (0.012)	-0.704 (0.046)	0.000 (0.000)	-3.345 (0.255)	1.243 (0.273)	2.102 (0.144)	
1K032001	SJ	4A	0.396 (0.028)	0.426 (0.063)	0.000 (0.000)	0.838 (0.100)	-0.838 (0.112)		
1K032101	SJ	5	0.575 (0.077)	0.226 (0.153)	0.194 (0.045)				
1K032701	SK	1	0.487 (0.057)	-1.384 (0.257)	0.226 (0.059)				
1K032901	SK	3	0.660 (0.086)	0.222 (0.134)	0.211 (0.042)				
1K034001	SL	5A	0.509 (0.044)	1.949 (0.136)	0.000 (0.000)	-0.080 (0.094)	0.080 (0.164)		
1K034201	SL	7	0.724 (0.084)	0.114 (0.113)	0.181 (0.038)				
1K034301	SL	8	0.593 (0.081)	0.343 (0.141)	0.189 (0.042)				
1K034801	SM	3	0.826 (0.118)	0.620 (0.103)	0.246 (0.035)				
1K034802	SM	4A	0.706 (0.050)	0.060 (0.054)	0.000 (0.000)				
1K034901	SM	5A	0.295 (0.023)	-1.779 (0.147)	0.000 (0.000)	-0.251 (0.200)	0.251 (0.141)		
1K034902	SM	6A	0.751 (0.038)	0.626 (0.035)	0.000 (0.000)	-0.244 (0.064)	0.244 (0.072)		
1K035401	SN	1	0.235 (0.053)	2.588 (0.549)	0.221 (0.042)				
1K035601	SN	3A	0.309 (0.026)	3.479 (0.198)	0.000 (0.000)	1.672 (0.110)	-1.672 (0.326)		
1K035701	SN	4	0.877 (0.126)	1.072 (0.085)	0.196 (0.026)				
1K035801	SN	5A	0.523 (0.028)	0.696 (0.045)	0.000 (0.000)	-0.179 (0.074)	0.179 (0.086)		
1K036201	SN	9	0.683 (0.122)	1.842 (0.177)	0.100 (0.021)				
1K036301	SN	10A	0.473 (0.028)	1.695 (0.093)	0.000 (0.000)	-1.372 (0.131)	1.372 (0.164)		
1K037301	SO	4A	0.389 (0.026)	2.200 (0.146)	0.000 (0.000)	-2.479 (0.220)	2.479 (0.267)		
1K037501	SO	6A	0.374 (0.069)	5.414 (1.108)	0.000 (0.000)	-1.985 (0.464)	1.985 (1.184)		
1K037701	SO	8A	0.373 (0.021)	-1.318 (0.077)	0.000 (0.000)	1.291 (0.268)	0.983 (0.156)	-2.273 (0.116)	
1K037702	SO	9A	0.646 (0.057)	1.566 (0.096)	0.000 (0.000)	0.237 (0.081)	-0.237 (0.139)		
1K038401	ST	1	0.642 (0.070)	-1.578 (0.214)	0.222 (0.058)				
1K039201	ST	9A	0.346 (0.027)	2.426 (0.197)	0.000 (0.000)	-1.804 (0.199)	1.804 (0.271)		
1K039301	ST	10A	0.495 (0.039)	0.754 (0.063)	0.000 (0.000)	0.410 (0.090)	-0.410 (0.110)		
1K039501	SU	1	0.888 (0.096)	-0.600 (0.131)	0.233 (0.048)				
1K039701	SU	3	0.687 (0.166)	1.731 (0.208)	0.232 (0.032)				
1K040001	SU	6A	0.419 (0.027)	0.852 (0.068)	0.000 (0.000)	-0.633 (0.116)	0.633 (0.134)		
1K040101	SU	7	0.640 (0.082)	-0.389 (0.179)	0.230 (0.053)				
1K040301	SU	9A	0.356 (0.038)	1.928 (0.167)	0.000 (0.000)	0.560 (0.123)	-0.560 (0.206)		

Table D-17

IRT Parameters for the 1996 Science Main Samples
Earth Science, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
2K031202	SE	2A	0.278 (0.033)	4.490 (0.431)	0.000 (0.000)	0.963 (0.137)	-0.963 (0.420)		
2K031205	SE	5	0.566 (0.056)	-0.834 (0.187)	0.218 (0.054)				
2K031208	SE	8	0.194 (0.042)	0.360 (0.557)	0.409 (0.051)				
2K031211	SE	11A	0.586 (0.047)	1.154 (0.067)	0.000 (0.000)	0.300 (0.078)	-0.300 (0.108)		
2K031401	SG	1A	0.272 (0.017)	3.767 (0.122)	0.000 (0.000)	3.259 (0.117)	0.161 (0.202)	-3.420 (0.840)	
2K031402	SG	2A	0.727 (0.051)	1.012 (0.064)	0.000 (0.000)				
2K031403	SG	3A	0.623 (0.032)	-0.520 (0.042)	0.000 (0.000)	0.656 (0.073)	-0.656 (0.057)		
2K031404	SG	4A	0.907 (0.049)	-0.438 (0.045)	0.000 (0.000)				
2K031405	SG	5	0.722 (0.212)	2.785 (0.446)	0.183 (0.018)				
2K031406	SG	6	0.432 (0.059)	-0.327 (0.269)	0.253 (0.060)				
2K031407	SG	7A	0.461 (0.036)	-1.038 (0.100)	0.000 (0.000)				
2K031408	SG	8A	0.600 (0.032)	-0.043 (0.040)	0.000 (0.000)	0.660 (0.069)	-0.660 (0.063)		
2K031409	SG	9A	0.488 (0.022)	0.381 (0.041)	0.000 (0.000)	-0.904 (0.095)	0.904 (0.098)		
2K031410	SG	10A	0.419 (0.028)	0.599 (0.058)	0.000 (0.000)	0.654 (0.089)	-0.654 (0.103)		
2K031801	SJ	2	0.799 (0.121)	0.935 (0.094)	0.187 (0.030)				
2K031901	SJ	3A	0.504 (0.031)	-0.085 (0.049)	0.000 (0.000)	0.603 (0.088)	-0.603 (0.081)		
2K032201	SJ	6	1.011 (0.109)	0.418 (0.069)	0.150 (0.027)				
2K032301	SJ	7	1.006 (0.185)	1.507 (0.118)	0.183 (0.021)				
2K032401	SJ	8	0.777 (0.131)	1.065 (0.104)	0.204 (0.031)				
2K032801	SK	2	0.590 (0.068)	-0.250 (0.163)	0.195 (0.047)				
2K033001	SK	4A	0.705 (0.048)	-1.156 (0.080)	0.000 (0.000)				
2K033101	SK	5A	0.523 (0.059)	3.268 (0.240)	0.000 (0.000)	0.859 (0.098)	-0.859 (0.395)		
2K033201	SK	6	0.733 (0.072)	-0.933 (0.160)	0.222 (0.052)				
2K033301	SK	7	0.547 (0.064)	-0.575 (0.200)	0.218 (0.054)				
2K033401	SK	8	0.505 (0.072)	0.313 (0.178)	0.197 (0.046)				
2K033601	SL	1	0.397 (0.053)	-2.489 (0.370)	0.222 (0.059)				
2K033701	SL	2	0.380 (0.050)	-1.101 (0.281)	0.211 (0.056)				
2K033801	SL	3	0.618 (0.080)	-0.169 (0.173)	0.221 (0.052)				
2K034101	SL	6A	1.438 (0.079)	0.834 (0.026)	0.000 (0.000)	0.478 (0.032)	-0.478 (0.046)		
2K034102	SM	9	0.600 (0.061)	-1.723 (0.209)	0.211 (0.056)				
2KW34101	SL	6B	1.871 (0.101)	0.497 (0.019)	0.000 (0.000)	0.322 (0.029)	-0.322 (0.030)		
2KX34101	SL	6C	1.583 (0.072)	0.766 (0.027)	0.000 (0.000)	0.886 (0.032)	-0.886 (0.052)		
2KY34101	SL	6D	1.200 (0.073)	0.870 (0.030)	0.000 (0.000)	0.068 (0.043)	-0.068 (0.054)		
2K035001	SM	7	0.703 (0.079)	-0.510 (0.165)	0.235 (0.052)				
2K035101	SM	8	0.726 (0.138)	1.189 (0.126)	0.233 (0.034)				
2K035201	SM	10A	0.414 (0.021)	0.712 (0.056)	0.000 (0.000)	-1.607 (0.138)	1.607 (0.147)		
2K035301	SM	11A	0.510 (0.021)	0.697 (0.058)	0.000 (0.000)	2.790 (0.109)	-0.996 (0.094)	-1.794 (0. 87)	
2K036001	SN	7	0.460 (0.142)	2.736 (0.506)	0.255 (0.032)				
2K036101	SN	8A	0.659 (0.034)	1.367 (0.050)	0.000 (0.000)	1.157 (0.054)	-1.157 (0.110)		
2K037401	SO	5A	0.981 (0.113)	2.473 (0.183)	0.000 (0.000)	-0.129 (0.106)	0.129 (0.265)		
2K037601	SO	7A	0.515 (0.048)	2.100 (0.135)	0.000 (0.000)	0.600 (0.088)	-0.600 (0.189)		
2K038601	ST	3	0.570 (0.225)	3.520 (0.987)	0.265 (0.022)				
2K038901	ST	6A	0.543 (0.035)	1.549 (0.071)	0.000 (0.000)	0.923 (0.075)	-1.864 (0.213)	0.940 (0.271)	
2K039101	ST	8	0.588 (0.102)	0.622 (0.163)	0.229 (0.046)				

Table D-17 (continued)

IRT Parameters for the 1996 Science Main Samples

Earth Science, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
2K039401	ST	11A	0.539 (0.025)	0.164 (0.068)	0.000 (0.000)	3.785 (0.186)	-0.795 (0.084)	-2.990 (0.212)	
2K039601	SU	2	0.718 (0.072)	-1.094 (0.165)	0.211 (0.053)				
2K039801	SU	4A	0.522 (0.034)	-1.432 (0.073)	0.000 (0.000)	1.306 (0.145)	-1.306 (0.076)		
2K040401	SU	10A	0.523 (0.032)	1.604 (0.075)	0.000 (0.000)	-1.822 (0.188)	1.718 (0.223)	0.104 (0.208)	
2K040501	SU	11A	0.686 (0.070)	0.795 (0.087)	0.000 (0.000)				

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Table D-18

IRT Parameters for the 1996 Science Main Samples
Life Science, Grade 4

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
3K031003	SC	3A	0.584 (0.030)	2.472 (0.054)	0.000 (0.000)	1.980 (0.051)	-1.980 (0.236)		
3K031004	SC	4A	0.715 (0.043)	-0.911 (0.065)	0.000 (0.000)				
3K031005	SC	5A	0.485 (0.028)	1.227 (0.059)	0.000 (0.000)	0.914 (0.066)	-0.914 (0.102)		
3K031006	SC	6A	0.618 (0.033)	-0.107 (0.038)	0.000 (0.000)	0.251 (0.069)	-0.251 (0.061)		
3K031007	SC	7A	0.414 (0.028)	0.647 (0.056)	0.000 (0.000)	-0.095 (0.097)	0.095 (0.108)		
3K031501	SH	1A	0.105 (0.005)	-2.818 (0.216)	0.000 (0.000)	-14.563 (0.824)	14.563 (0.796)		
3K031502	SH	2A	0.311 (0.012)	1.906 (0.090)	0.000 (0.000)	3.369 (0.105)	-3.369 (0.225)		
3K031503	SH	3A	0.303 (0.022)	2.325 (0.134)	0.000 (0.000)	1.373 (0.105)	-1.373 (0.205)		
3K031504	SH	4	0.721 (0.071)	-2.361 (0.219)	0.258 (0.062)				
3K031505	SH	5A	0.598 (0.032)	-0.989 (0.050)	0.000 (0.000)	0.801 (0.088)	-0.801 (0.057)		
3K031506	SH	6A	0.584 (0.025)	1.297 (0.032)	0.000 (0.000)	2.323 (0.079)	1.320 (0.066)	-0.015 (0.078)	-3.628 (0.440)
3K031507	SH	7A	0.262 (0.011)	0.744 (0.108)	0.000 (0.000)	3.178 (0.154)	-3.178 (0.191)		
3K031508	SH	8A	0.820 (0.074)	1.437 (0.095)	0.000 (0.000)				
3K031509	SH	3G	0.377 (0.019)	2.083 (0.077)	0.000 (0.000)	2.166 (0.083)	-2.166 (0.196)		
3K031601	SI	1	0.792 (0.079)	-0.192 (0.116)	0.222 (0.041)				
3K031602	SI	2A	0.515 (0.031)	0.799 (0.051)	0.000 (0.000)	0.185 (0.072)	-0.185 (0.090)		
3K031603	SI	3A	0.477 (0.027)	-1.307 (0.074)	0.000 (0.000)	-0.144 (0.118)	0.144 (0.084)		
3K031604	SI	4A	0.343 (0.030)	3.601 (0.197)	0.000 (0.000)	1.692 (0.104)	-1.692 (0.360)		
3K031606	SI	6A	0.396 (0.026)	2.774 (0.105)	0.000 (0.000)	1.902 (0.084)	-1.902 (0.266)		
3K031607	SI	7A	0.464 (0.025)	-0.567 (0.054)	0.000 (0.000)	-0.161 (0.100)	0.161 (0.085)		
3K031608	SI	8A	0.457 (0.033)	3.458 (0.100)	0.000 (0.000)	2.482 (0.078)	-2.482 (0.470)		
3K031609	SI	9A	0.603 (0.050)	2.105 (0.133)	0.000 (0.000)	-0.209 (0.092)	0.209 (0.168)		
3K031701	SJ	1	0.801 (0.100)	0.163 (0.122)	0.259 (0.042)				
3K032601	SJ	10A	0.680 (0.044)	1.378 (0.058)	0.000 (0.000)	0.858 (0.058)	-0.858 (0.110)		
3K032602	SJ	11A	0.449 (0.030)	0.586 (0.063)	0.000 (0.000)	1.083 (0.094)	-1.083 (0.111)		
3K033501	SK	9A	1.201 (0.103)	1.485 (0.077)	0.000 (0.000)				
3K033502	SK	10A	0.500 (0.035)	0.806 (0.060)	0.000 (0.000)	0.646 (0.081)	-0.646 (0.104)		
3K033503	SK	11A	0.527 (0.031)	0.445 (0.057)	0.000 (0.000)	1.228 (0.083)	-1.228 (0.097)		
3K033901	SL	4	0.665 (0.089)	0.347 (0.133)	0.217 (0.041)				
3K034601	SM	1	0.304 (0.055)	0.407 (0.343)	0.243 (0.057)				
3K034701	SM	2	0.842 (0.184)	1.460 (0.146)	0.306 (0.029)				
3K035501	SN	2	0.386 (0.050)	-0.804 (0.292)	0.250 (0.059)				
3K035901	SN	6A	0.391 (0.045)	3.310 (0.324)	0.000 (0.000)	0.064 (0.123)	-0.064 (0.301)		
3K037001	SO	1	0.833 (0.139)	1.215 (0.108)	0.177 (0.027)				
3K037101	SO	2	0.511 (0.063)	-0.985 (0.238)	0.251 (0.058)				
3K037201	SO	3	0.578 (0.117)	1.135 (0.175)	0.262 (0.042)				
3K038501	ST	2	0.836 (0.089)	-1.281 (0.169)	0.272 (0.058)				
3K038701	ST	4	0.873 (0.108)	0.207 (0.107)	0.231 (0.038)				
3K038801	ST	5A	0.530 (0.022)	0.454 (0.063)	0.000 (0.000)	3.658 (0.145)	-0.710 (0.081)	-2.949 (0.227)	
3K039001	ST	7	0.598 (0.076)	-0.427 (0.192)	0.252 (0.054)				
3K039901	SU	5A	0.465 (0.022)	-1.054 (0.040)	0.000 (0.000)	3.220 (0.273)	-0.844 (0.113)	-1.665 (0.127)	-0.711 (0.120)
3K040201	SU	8	0.755 (0.201)	2.280 (0.314)	0.155 (0.022)				
3K0310CL	SC		0.214 (0.006)	0.178 (0.040)	0.000 (0.000)	-9.983 (0.660)	7.280 (0.678)	-0.633 (0.271)	3.337 (0.227)
3K0325CL	SJ		0.296 (0.013)	-0.946 (0.059)	0.000 (0.000)	-0.659 (0.253)	0.486 (0.237)	-1.851 (0.229)	2.024 (0.195)

Table D-19

IRT Parameters for 1996 Science Items

Physical Science, Grade 8

NAEP ID	Block	Item	a_j (s.e.)	b_j (s.e.)	c_j (s.e.)	d_{j1} (s.e.)	d_{j2} (s.e.)	d_{j3} (s.e.)	d_{j4} (s.e.)
1K040601	SC	1A	0.573 (0.036)	-0.130 (0.051)	0.000 (0.000)				
1K0406CL	SC		0.493 (0.020)	-0.488 (0.026)	0.000 (0.000)	1.772 (0.150)	0.777 (0.101)	-0.201 (0.082)	-0.899 (0.081)	-1.449 (0.090)
1K040603	SC	3A	0.440 (0.016)	-0.288 (0.041)	0.000 (0.000)	-2.167 (0.132)	2.167 (0.127)		
1K040604	SC	4A	0.585 (0.023)	0.365 (0.033)	0.000 (0.000)	-0.831 (0.077)	0.831 (0.080)		
1K040605	SC	5A	0.505 (0.032)	0.523 (0.045)	0.000 (0.000)	0.353 (0.073)	-0.353 (0.082)		
1K040606	SC	6A	0.497 (0.019)	-0.241 (0.043)	0.000 (0.000)	2.683 (0.137)	-1.683 (0.086)	-0.999 (0.107)	
1K040702	SD	3A	0.669 (0.031)	-0.416 (0.034)	0.000 (0.000)	0.579 (0.061)	-0.579 (0.049)		
1K040704	SD	5A	0.804 (0.034)	-0.606 (0.032)	0.000 (0.000)	0.062 (0.057)	-0.062 (0.045)		
1K040705	SD	6A	0.237 (0.029)	1.830 (0.243)	0.000 (0.000)				
1K031309	SF	6G	0.307 (0.013)	-2.835 (0.131)	0.000 (0.000)	-4.062 (0.545)	1.697 (0.513)	2.365 (0.183)	
1K031302	SF	7A	0.472 (0.034)	2.436 (0.119)	0.000 (0.000)	0.861 (0.071)	-0.861 (0.179)		
1K031305	SF	8A	0.718 (0.053)	2.437 (0.105)	0.000 (0.000)	0.659 (0.058)	-0.659 (0.186)		
1K031306	SF	9A	0.576 (0.072)	3.146 (0.323)	0,000 (0.000)				
1K041901	SJ	6A	0.439 (0.035)	2.847 (0.134)	0.000 (0.000)	1.478 (0.088)	-1.478 (0.284)		
1K042301	SJ	11	0.292 (0.072)	2.113 (0.458)	0.261 (0.053)				
1K042401	SJ	12	1.399 (0.197)	1.622 (0.098)	0.259 (0.016)				
1K042501	SJ	13	0.965 (0.211)	1.984 (0.173)	0.195 (0.019)				
1K042801	SK	4	0.673 (0.108)	1.325 (0.125)	0.156 (0.030)				
1K042901	SK	5	0.810 (0.253)	2.577 (0.390)	0.215 (0.020)				
1K043201	SK	10	0.323 (0.056)	0.158 (0.341)	0.254 (0.060)				
1K043501	SK	13A	0.586 (0.029)	0.010 (0.049)	0.000 (0.000)	1.297 (0.079)	-1.297 (0.074)		
1K043601	SK	14A	0.510 (0.032)	1.405 (0.067)	0.000 (0.000)	1.233 (0.075)	-1.233 (0.134)		
1K043602	SK	15A	0.551 (0.063)	2.951 (0.275)	0.000 (0.000)	-0.405 (0.139)	0.405 (0.306)		
1K043603	SK	16A	0.647 (0.052)	-1.052 (0.098)	0.000 (0.000)				
1K046801	SL	1	0.407 (0.068)	0.147 (0.273)	0.260 (0.058)				
1K046901	SL	2	0.789 (0.099)	0.278 (0.112)	0.229 (0.038)				
1K047101	SL	4	1.109 (0.108)	0.166 (0.069)	0.177 (0.029)				
1K047201	SL	5A	0.547 (0.024)	0.365 (0.033)	0.000 (0.000)	0.219 (0.080)	-1.441 (0.136)	1.221 (0.138)	
1K047401	SL	7A	0.630 (0.034)	0.940 (0.050)	0.000 (0.000)	-0.427 (0.078)	0.427 (0.095)		
1K047901	SL	12A	0.759 (0.046)	0.873 (0.044)	0.000 (0.000)	0.303 (0.056)	-0.303 (0.076)		
1K048201	SM	1	1.049 (0.146)	1.002 (0.079)	0.209 (0.025)				
1K048501	SM	4	1.455 (0.216)	1.014 (0.068)	0.301 (0.022)				
1K048601	SM	5A	0.428 (0.027)	1.176 (0.072)	0.000 (0.000)	1.261 (0.086)	-1.261 (0.134)		
1K049001	SM	9A	0.450 (0.088)	5.270 (1.109)	0.000 (0.000)	-1.817 (0.491)	1.817 (1.367)		
1K049101	SM	10	0.472 (0.057)	-0.337 (0.195)	0.202 (0.049)				
1K035401	SN	1	0.261 (0.049)	1.318 (0.366)	0.263 (0.048)				
1K035601	SN	3A	0.283 (0.023)	2.225 (0.146)	0.000 (0.000)	1.140 (0.112)	-1.140 (0.197)		
1K035701	SN	4	0.975 (0.109)	0.680 (0.074)	0.216 (0.027)				
1K035801	SN	5A	0.545 (0.025)	-0.516 (0.042)	0.000 (0.000)	-0.218 (0.081)	0.218 (0.070)		
1K036201	SN	8	0.883 (0.078)	0.477 (0.066)	0.121 (0.024)				
1K036301	SN	9A	0.505 (0.019)	0.553 (0.038)	0.000 (0.000)	-1.522 (0.103)	1.522 (0.108)		
1K036601	SN	13	0.575 (0.060)	-0.207 (0.151)	0.199 (0.045)				
1K036901	SN	16	0.843 (0.078)	-0.176 (0.099)	0.201 (0.038)				
1K037301	SO	4A	0.418 (0.020)	0.987 (0.060)	0.000 (0.000)	-2.174 (0.156)	2.174 (0.168)		
1K037501	SO	6A	0.611 (0.048)	2.226 (0.138)	0.000 (0.000)	-0.439 (0.104)	0.439 (0.183)		
1K037701	SO	8A	0.324 (0.024)	-3.165 (0.149)	0.000 (0.000)	0.225 (0.625)	1.852 (0.316)	-2.077 (0.112)	
1K037703	SO	9A	0.532 (0.035)	0.673 (0.052)	0.000 (0.000)	0.473 (0.075)	-0.473 (0.091)		
1K037901	SO	11	0.729 (0.160)	1.996 (0.212)	0.185 (0.025)				
1K038301	SO	16A	0.744 (0.035)	1.394 (0.036)	0.000 (0.000)	2.374 (0.074)	0.932 (0.059)	-1.084 (0.122)	-2.221 (0.455)

Table D-19 (continued)

IRT Parameters for the 1996 Science Main Samples

Physical Science, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
1K043901	ST	3	0.698 (0.090)	0.076 (0.141)	0.248 (0.045)					
1K044201	ST	6A	0.463 (0.024)	-0.282 (0.060)	0.000 (0.000)	1.543 (0.101)	-1.543 (0.089)			
1K044301	ST	7A	0.484 (0.031)	-0.142 (0.050)	0.000 (0.000)	0.598 (0.090)	-0.598 (0.084)			
1K044701	ST	11	0.616 (0.102)	1.530 (0.157)	0.136 (0.027)					
1K045101	ST	15A	0.523 (0.029)	1.285 (0.056)	0.000 (0.000)	-0.419 (0.101)	0.754 (0.128)	-0.334 (0.155)		
1K045102	ST	16A	0.450 (0.032)	1.496 (0.083)	0.000 (0.000)	0.652 (0.093)	-1.132 (0.178)	0.481 (0.235)		
1K045401	SU	3	0.761 (0.102)	-0.369 (0.182)	0.344 (0.057)					
1K045501	SU	4	0.824 (0.161)	1.200 (0.132)	0.342 (0.033)					
1K045801	SU	7A	0.522 (0.027)	1.562 (0.063)	0.000 (0.000)	1.849 (0.070)	-1.849 (0.162)			
1K045901	SU	8	0.401 (0.080)	0.753 (0.294)	0.293 (0.059)					
1K046201	SU	11	0.462 (0.123)	2.139 (0.333)	0.282 (0.041)					
1K046501	SU	14A	0.699 (0.044)	1.280 (0.056)	0.000 (0.000)	0.775 (0.057)	-0.775 (0.102)			
1K046601	SU	15A	0.554 (0.035)	0.535 (0.048)	0.000 (0.000)	0.211 (0.077)	-0.211 (0.088)			

Table D-20

IRT Parameters for the 1996 Science Main Samples

Earth Science, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
2K040701	SD	1A	0.361 (0.015)	1.169 (0.055)	0.000 (0.000)	1.346 (0.083)	-3.294 (0.206)	1.948 (0.234)		
2K040706	SD	7	0.644 (0.075)	-1.906 (0.289)	0.505 (0.068)					
2K040708	SD	9A	0.503 (0.024)	1.446 (0.063)	0.000 (0.000)	-0.662 (0.083)	0.662 (0.109)			
2K040709	SD	10	0.694 (0.088)	-0.624 (0.233)	0.475 (0.058)					
2K040713	SD	14A	0.631 (0.024)	0.810 (0.029)	0.000 (0.000)	-0.385 (0.072)	-0.322 (0.106)	0.707 (0.102)		
2K040801	SE	0A	0.498 (0.025)	-0.763 (0.048)	0.000 (0.000)	0.125 (0.085)	-0.125 (0.067)			
2K040802	SE	1A	0.565 (0.025)	-1.561 (0.063)	0.000 (0.000)	-0.868 (0.118)	0.868 (0.090)			
2K040808	SE	1G	0.570 (0.020)	0.032 (0.033)	0.000 (0.000)	-1.497 (0.099)	1.497 (0.098)			
2K040809	SE	1M	0.621 (0.023)	0.639 (0.034)	0.000 (0.000)	-1.304 (0.092)	1.304 (0.098)			
2K040803	SE	2A	0.737 (0.045)	-0.238 (0.049)	0.000 (0.000)					
2K040804	SE	3A	0.774 (0.051)	1.779 (0.076)	0.000 (0.000)	-0.494 (0.091)	0.494 (0.129)			
2K040805	SE	4A	0.799 (0.046)	1.489 (0.057)	0.000 (0.000)	-0.918 (0.106)	0.918 (0.127)			
2K040806	SE	5A	1.037 (0.104)	1.612 (0.095)	0.000 (0.000)					
2K040901	SG	1A	0.831 (0.046)	-0.777 (0.052)	0.000 (0.000)					
2K040902	SG	2A	0.479 (0.029)	1.311 (0.066)	0.000 (0.000)	0.820 (0.069)	-0.820 (0.110)			
2K040903	SG	3A	0.542 (0.030)	0.627 (0.045)	0.000 (0.000)	0.635 (0.064)	-0.635 (0.078)			
2K040904	SG	4A	0.667 (0.045)	0.994 (0.067)	0.000 (0.000)					
2K040905	SG	5A	1.106 (0.142)	2.681 (0.212)	0.000 (0.000)					
2K041001	SG	6	0.552 (0.053)	-0.485 (0.161)	0.186 (0.047)					
2K041002	SG	7A	0.589 (0.026)	-0.085 (0.035)	0.000 (0.000)	-0.121 (0.070)	0.121 (0.066)			
2K041003	SG	8	1.185 (0.094)	-1.184 (0.093)	0.202 (0.045)					
2K041004	SG	9A	0.559 (0.028)	0.714 (0.043)	0.000 (0.000)	0.002 (0.067)	-0.002 (0.079)			
2K041101	SG	10A	0.578 (0.044)	1.299 (0.092)	0.000 (0.000)					
2K041201	SG	11A	0.433 (0.020)	1.048 (0.057)	0.000 (0.000)	-1.027 (0.101)	1.027 (0.118)			
2K041202	SG	12A	0.548 (0.033)	1.784 (0.088)	0.000 (0.000)	-0.472 (0.088)	0.472 (0.130)			
2K041501	SJ	1	0.309 (0.046)	-2.282 (0.433)	0.225 (0.061)					
2K041601	SJ	2	0.420 (0.057)	-0.287 (0.253)	0.224 (0.058)					
2K041701	SJ	3	1.071 (0.284)	2.745 (0.330)	0.188 (0.013)					
2K041801	SJ	4	0.806 (0.084)	-0.527 (0.138)	0.230 (0.051)					
2K041802	SJ	5	1.032 (0.157)	1.130 (0.090)	0.251 (0.025)					
2K042201	SJ	10A	0.736 (0.073)	2.752 (0.187)	0.000 (0.000)	-0.008 (0.106)	0.008 (0.266)			
2K042701	SK	1	0.616 (0.083)	0.298 (0.160)	0.227 (0.048)					
2K042702	SK	2	1.097 (0.127)	0.530 (0.076)	0.229 (0.030)					
2K042703	SK	3	1.099 (0.135)	0.492 (0.084)	0.278 (0.032)					
2K043101	SK	7A	0.589 (0.029)	0.120 (0.039)	0.000 (0.000)	-0.199 (0.078)	0.199 (0.078)			
2K043102	SK	8A	0.349 (0.019)	0.116 (0.047)	0.000 (0.000)	-0.438 (0.149)	1.001 (0.148)	-0.563 (0.130)		
2K043103	SK	9A	0.614 (0.049)	2.194 (0.125)	0.000 (0.000)	0.107 (0.084)	-0.107 (0.168)			
2K043301	SK	11	0.690 (0.093)	0.806 (0.116)	0.186 (0.035)					
2K047001	SL	3	0.393 (0.071)	1.090 (0.246)	0.204 (0.049)					
2K047301	SL	6A	0.567 (0.038)	1.185 (0.065)	0.000 (0.000)	0.451 (0.071)	-0.451 (0.106)			
2K047601	SL	9	1.091 (0.191)	2.004 (0.151)	0.096 (0.013)					
2K048301	SM	2	0.876 (0.088)	-0.300 (0.112)	0.209 (0.042)					
2K048701	SM	6	0.367 (0.060)	0.493 (0.272)	0.218 (0.055)					
2K048801	SM	7	0.639 (0.153)	1.995 (0.232)	0.243 (0.030)					
2K049401	SM	13A	0.608 (0.037)	1.718 (0.065)	0.000 (0.000)	1.254 (0.063)	-1.254 (0.149)			
2K049402	SM	14A	0.411 (0.029)	0.244 (0.058)	0.000 (0.000)	0.525 (0.101)	-0.525 (0.106)			
2K036101	SN	7A	0.327 (0.013)	0.555 (0.078)	0.000 (0.000)	2.610 (0.110)	-2.610 (0.135)			
2K0364CL	SN		0.441 (0.029)	3.001 (0.093)	0.000 (0.000)	1.827 (0.077)	0.678 (0.134)	-2.505 (0.601)		
2K036402	SN	11A	0.286 (0.025)	2.341 (0.177)	0.000 (0.000)	0.629 (0.117)	-0.629 (0.200)			

Table D-20 (continued)

IRT Parameters for the 1996 Science Main Samples

Earth Science, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
2K037401	SO	5A	0.623 (0.052)	2.286 (0.135)	0.000 (0.000)	0.175 (0.085)	-0.175 (0.184)			
2K037601	SO	7A	0.566 (0.035)	0.692 (0.051)	0.000 (0.000)	0.659 (0.070)	-0.659 (0.089)			
2K037801	SO	10	0.838 (0.108)	0.823 (0.092)	0.181 (0.030)					
2K038201	SO	15A	0.362 (0.035)	4.344 (0.219)	0.000 (0.000)	2.264 (0.114)	-2.264 (0.607)			
2K043801	ST	2	0.845 (0.101)	0.119 (0.117)	0.244 (0.041)					
2K044001	ST	4	1.391 (0.228)	2.461 (0.187)	0.076 (0.008)					
2K044101	ST	5A	0.852 (0.061)	1.114 (0.069)	0.000 (0.000)					
2K044401	ST	8A	0.668 (0.049)	-1.267 (0.087)	0.000 (0.000)					
2K044501	ST	9	1.029 (0.195)	1.577 (0.120)	0.253 (0.021)					
2K044801	ST	12	0.296 (0.050)	0.199 (0.361)	0.232 (0.060)					
2K045701	SU	6A	0.451 (0.030)	0.070 (0.053)	0.000 (0.000)	0.603 (0.092)	-0.603 (0.094)			
2K046101	SU	10	0.700 (0.077)	0.173 (0.117)	0.168 (0.039)					
2K0407CL	SD		0.836 (0.032)	-0.003 (0.022)	0.000 (0.000)	0.948 (0.052)	-0.602 (0.053)	-0.346 (0.055)		
2K0494CL	SM		0.164 (0.008)	2.326 (0.103)	0.000 (0.000)	-11.081 (0.930)	9.529 (0.977)	3.780 (0.423)	0.304 (0.413)	-2.532 (0.653)

Table D-21

IRT Parameters for the 1996 Science Main Samples
Life Science, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
3K031307	SF	10A	1.053 (0.057)	1.643 (0.040)	0.000 (0.000)	0.813 (0.036)	-0.813 (0.099)			
3K031308	SF	11A	0.433 (0.034)	2.539 (0.181)	0.000 (0.000)	-0.898 (0.128)	0.898 (0.207)			
3K041301	SH	1	0.714 (0.067)	-2.541 (0.206)	0.220 (0.057)					
3K041302	SH	2	0.816 (0.069)	-1.692 (0.163)	0.242 (0.059)					
3K041303	SH	3	0.693 (0.061)	-1.058 (0.158)	0.221 (0.051)					
3K041304	SH	4	0.756 (0.077)	0.272 (0.091)	0.167 (0.032)					
3K041305	SH	5	1.045 (0.081)	-0.804 (0.095)	0.201 (0.039)					
3K041306	SH	6A	0.526 (0.036)	-0.709 (0.075)	0.000 (0.000)					
3K041307	SH	7A	0.463 (0.031)	1.594 (0.088)	0.000 (0.000)	-0.141 (0.081)	0.141 (0.120)			
3K041401	SH	8A	0.771 (0.034)	0.831 (0.035)	0.000 (0.000)	0.988 (0.045)	-0.988 (0.066)			
3K041402	SH	9A	0.986 (0.047)	1.588 (0.035)	0.000 (0.000)	1.124 (0.035)	-1.124 (0.110)			
3K041403	SH	10A	0.268 (0.022)	4.408 (0.206)	0.000 (0.000)	2.471 (0.120)	-2.471 (0.436)			
3K031601	SI	1	0.658 (0.059)	-2.226 (0.197)	0.218 (0.057)					
3K031602	SI	2A	0.362 (0.023)	-0.443 (0.060)	0.000 (0.000)	0.742 (0.108)	-0.742 (0.094)			
3K031603	SI	3A	0.651 (0.042)	-1.551 (0.091)	0.000 (0.000)					
3K031604	SI	4A	0.429 (0.030)	1.949 (0.102)	0.000 (0.000)	0.888 (0.077)	-0.888 (0.155)			
3K031605	SI	5	0.409 (0.044)	-1.641 (0.266)	0.218 (0.057)					
3K031606	SI	6A	0.491 (0.025)	1.040 (0.055)	0.000 (0.000)	1.227 (0.067)	-1.227 (0.103)			
3K031610	SI	7A	0.601 (0.024)	0.226 (0.044)	0.000 (0.000)	1.453 (0.064)	-1.453 (0.070)			
3K031607	SI	8A	0.504 (0.023)	-0.711 (0.040)	0.000 (0.000)	0.382 (0.120)	0.863 (0.094)	-1.246 (0.069)		
3K031608	SI	9A	0.501 (0.023)	1.861 (0.059)	0.000 (0.000)	2.048 (0.063)	-2.048 (0.175)			
3K031609	SI	10A	0.364 (0.022)	1.184 (0.079)	0.000 (0.000)	-0.521 (0.104)	0.521 (0.130)			
3K031611	SI	11A	0.336 (0.042)	2.751 (0.328)	0.000 (0.000)					
3K031612	SI	12	0.814 (0.084)	-0.435 (0.136)	0.271 (0.046)					
3K031613	SI	13A	0.653 (0.043)	2.217 (0.118)	0.000 (0.000)	-1.268 (0.136)	1.268 (0.189)			
3K042001	SJ	7A	0.549 (0.040)	1.939 (0.090)	0.000 (0.000)	0.940 (0.071)	-0.940 (0.163)			
3K042101	SJ	8A	0.217 (0.031)	9.143 (0.634)	0.000 (0.000)	4.783 (0.204)	-4.783 (2.220)			
3K042102	SJ	9A	0.745 (0.039)	1.368 (0.048)	0.000 (0.000)	1.250 (0.052)	-1.250 (0.115)			
3K042601	SJ	14A	0.588 (0.028)	0.458 (0.039)	0.000 (0.000)	-0.704 (0.087)	0.704 (0.091)			
3K042602	SJ	15A	0.628 (0.042)	1.094 (0.056)	0.000 (0.000)	0.619 (0.065)	-0.619 (0.096)			
3K042603	SJ	16A	0.525 (0.061)	2.088 (0.204)	0.000 (0.000)					
3K043001	SK	6A	0.267 (0.033)	3.195 (0.337)	0.000 (0.000)	0.525 (0.151)	-0.525 (0.303)			
3K043401	SK	12	0.201 (0.040)	-0.641 (0.533)	0.242 (0.061)					
3K047501	SL	8	0.252 (0.075)	3.689 (0.881)	0.224 (0.042)					
3K047701	SL	10	0.837 (0.291)	2.676 (0.482)	0.159 (0.017)					
3K047801	SL	11	0.991 (0.163)	1.269 (0.097)	0.204 (0.023)					
3K048001	SL	13A	0.835 (0.035)	1.080 (0.050)	0.000 (0.000)	1.955 (0.054)	-1.955 (0.135)			
3K048101	SL	14A	0.397 (0.028)	1.967 (0.124)	0.000 (0.000)	-0.260 (0.118)	-1.932 (0.335)	2.191 (0.385)		
3K048102	SL	15A	0.704 (0.103)	3.792 (0.310)	0.000 (0.000)	1.081 (0.111)	-1.081 (1.015)			
3K048103	SL	16A	0.555 (0.052)	0.871 (0.093)	0.000 (0.000)					
3K048401	SM	3	0.496 (0.097)	1.015 (0.191)	0.246 (0.046)					
3K048901	SM	8A	0.519 (0.033)	0.577 (0.051)	0.000 (0.000)	0.645 (0.076)	-0.645 (0.091)			
3K049201	SM	11	0.152 (0.035)	0.427 (0.650)	0.251 (0.057)					
3K049301	SM	12A	0.303 (0.057)	4.416 (0.785)	0.000 (0.000)					
3K035501	SN	2	0.528 (0.050)	-1.750 (0.218)	0.220 (0.057)					
3K035901	SN	6A	0.523 (0.032)	1.386 (0.071)	0.000 (0.000)	-0.090 (0.073)	0.090 (0.104)			
3K036501	SN	12	0.539 (0.097)	0.826 (0.171)	0.277 (0.046)					
3K036701	SN	14A	0.478 (0.040)	2.558 (0.189)	0.000 (0.000)	-0.510 (0.109)	0.510 (0.202)			
3K036801	SN	15A	0.679 (0.036)	1.240 (0.052)	0.000 (0.000)	-0.217 (0.062)	0.217 (0.085)			

Table D-21 (continued)

IRT Parameters for the 1996 Science Main Samples
Life Science, Grade 8

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
3K037101	SO	2	0.220 (0.041)	-2.919 (0.665)	0.240 (0.062)					
3K037201	SO	3	0.644 (0.066)	-1.386 (0.196)	0.231 (0.058)					
3K038001	SO	12	0.927 (0.213)	1.796 (0.174)	0.232 (0.023)					
3K038002	SO	13	1.433 (0.192)	1.318 (0.072)	0.176 (0.017)					
3K038101	SO	14A	0.637 (0.081)	2.529 (0.259)	0.000 (0.000)					
3K043701	ST	1	0.510 (0.063)	-0.666 (0.230)	0.240 (0.058)					
3K044601	ST	10	0.329 (0.110)	4.057 (1.009)	0.199 (0.032)					
3K044901	ST	13A	0.590 (0.026)	0.747 (0.054)	0.000 (0.000)	1.629 (0.070)	-1.629 (0.101)			
3K045001	ST	14A	0.433 (0.027)	1.302 (0.074)	0.000 (0.000)	1.319 (0.086)	-1.319 (0.140)			
3K045201	SU	1	0.508 (0.057)	-1.736 (0.261)	0.240 (0.062)					
3K045301	SU	2A	0.317 (0.027)	1.120 (0.102)	0.000 (0.000)	0.648 (0.119)	-0.648 (0.158)			
3K045601	SU	5A	0.414 (0.024)	1.528 (0.071)	0.000 (0.000)	-0.538 (0.120)	1.288 (0.146)	-0.750 (0.197)		
3K046001	SU	9	0.444 (0.064)	0.465 (0.184)	0.177 (0.044)					
3K046301	SU	12A	0.253 (0.011)	2.279 (0.130)	0.000 (0.000)	4.350 (0.150)	-4.350 (0.329)			
3K046401	SU	13A	0.610 (0.056)	2.127 (0.143)	0.000 (0.000)	0.139 (0.084)	-0.139 (0.177)			
3K046701	SU	16A	0.464 (0.020)	1.332 (0.065)	0.000 (0.000)	2.472 (0.092)	-1.658 (0.145)	-0.815 (0.266)		

Table D-22

IRT Parameters for 1996 Science Items
Physical Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
1K049501	SC	2A	0.234 (0.011)	-3.558 (0.198)	0.000 (0.000)	-2.892 (0.528)	0.080 (0.444)	2.811 (0.221)		
1K049502	SC	4A	0.342 (0.020)	2.539 (0.147)	0.000 (0.000)	-1.006 (0.124)	-2.028 (0.381)	3.033 (0.437)		
1K049503	SC	5A	0.941 (0.047)	-0.019 (0.035)	0.000 (0.000)					
1K049601	SD	1A	0.645 (0.035)	1.651 (0.050)	0.000 (0.000)	0.924 (0.052)	-0.021 (0.083)	-0.903 (0.175)		
1K049602	SD	2A	0.182 (0.008)	-1.686 (0.124)	0.000 (0.000)	-4.953 (0.307)	4.953 (0.281)			
1K049603	SD	3A	0.390 (0.015)	-0.697 (0.043)	0.000 (0.000)	0.110 (0.125)	-3.289 (0.213)	3.180 (0.203)		
1K049604	SD	4A	0.630 (0.031)	0.582 (0.037)	0.000 (0.000)	-0.385 (0.072)	0.385 (0.078)			
1K049701	SF	1A	0.412 (0.016)	-0.645 (0.048)	0.000 (0.000)	-1.663 (0.121)	1.663 (0.111)			
1K049702	SF	2A	0.941 (0.057)	-1.321 (0.066)	0.000 (0.000)					
1K049708	SF	3A	1.172 (0.056)	-0.055 (0.030)	0.000 (0.000)					
1K049703	SF	4A	1.373 (0.091)	1.450 (0.053)	0.000 (0.000)					
1K049704	SF	5A	1.241 (0.052)	-0.707 (0.025)	0.000 (0.000)	0.769 (0.049)	-0.769 (0.029)			
1K049705	SF	6A	0.652 (0.025)	0.325 (0.025)	0.000 (0.000)	-0.416 (0.077)	0.874 (0.079)	-0.459 (0.064)		
1K049706	SF	7A	1.383 (0.069)	0.146 (0.028)	0.000 (0.000)					
1K049707	SF	8A	0.585 (0.026)	0.665 (0.028)	0.000 (0.000)	0.525 (0.088)	1.138 (0.084)	-0.328 (0.078)	-1.335 (0.118)	
1K049806	SG	6	0.947 (0.081)	-0.275 (0.091)	0.205 (0.038)					
1K049808	SG	8	0.651 (0.069)	-0.120 (0.141)	0.219 (0.045)					
1K049914	SI	12A	0.740 (0.029)	0.687 (0.032)	0.000 (0.000)	-1.121 (0.086)	1.121 (0.092)			
1K049912	SI	13A	0.631 (0.033)	1.332 (0.041)	0.000 (0.000)	0.409 (0.067)	0.285 (0.093)	-0.335 (0.133)	-0.359 (0.178)	
1K049913	SI	14	1.369 (0.164)	0.922 (0.056)	0.178 (0.020)					
1K050001	SJ	1	0.624 (0.067)	-0.936 (0.176)	0.224 (0.051)					
1K050101	SJ	2	0.679 (0.087)	0.347 (0.130)	0.203 (0.042)					
1K050201	SJ	3	1.609 (0.220)	0.904 (0.056)	0.268 (0.021)					
1K050401	SJ	5A	0.323 (0.042)	3.855 (0.404)	0.000 (0.000)	0.767 (0.143)	-0.767 (0.415)			
1K050701	SJ	8	1.711 (0.208)	1.457 (0.078)	0.261 (0.015)					
1K050801	SJ	9	1.658 (0.163)	0.320 (0.049)	0.190 (0.024)					
1K050802	SJ	10	1.430 (0.135)	0.262 (0.055)	0.175 (0.025)					
1K051401	SK	2	0.874 (0.117)	0.335 (0.118)	0.292 (0.041)					
1K051501	SK	3	1.095 (0.206)	1.310 (0.103)	0.312 (0.025)					
1K051901	SK	7	1.165 (0.234)	1.671 (0.134)	0.298 (0.020)					
1K052301	SK	11A	0.333 (0.022)	3.806 (0.106)	0.000 (0.000)	3.617 (0.106)	-3.617 (0.532)			
1K052401	SK	12A	0.584 (0.032)	1.107 (0.047)	0.000 (0.000)	0.056 (0.077)	-0.281 (0.117)	0.226 (0.137)		
1K052402	SK	13A	0.517 (0.037)	3.407 (0.074)	0.000 (0.000)	2.987 (0.071)	-2.987 (0.619)			
1K046801	SL	1	0.576 (0.065)	-0.683 (0.183)	0.220 (0.052)					
1K046901	SL	2	0.907 (0.083)	-0.323 (0.097)	0.180 (0.038)					
1K047101	SL	4	1.061 (0.092)	-0.592 (0.090)	0.190 (0.039)					
1K047201	SL	5A	0.542 (0.023)	-0.444 (0.037)	0.000 (0.000)	0.485 (0.101)	-1.391 (0.122)	0.906 (0.113)		
1K047401	SL	7A	0.521 (0.027)	0.501 (0.046)	0.000 (0.000)	-0.561 (0.091)	0.561 (0.099)			
1K047901	SL	12A	0.706 (0.041)	0.133 (0.038)	0.000 (0.000)	0.490 (0.064)	-0.490 (0.064)			
1K048201	SM	1	1.725 (0.166)	-0.047 (0.058)	0.240 (0.031)					
1K048501	SM	4	1.046 (0.130)	0.258 (0.099)	0.292 (0.038)					
1K048601	SM	5A	0.572 (0.035)	0.177 (0.046)	0.000 (0.000)	0.775 (0.075)	-0.775 (0.078)			
1K049001	SM	9A	0.989 (0.074)	1.683 (0.062)	0.000 (0.000)	-2.047 (0.277)	2.047 (0.288)			
1K049101	SM	10	0.410 (0.053)	-0.985 (0.258)	0.214 (0.055)					
1K052601	SN	1	0.623 (0.064)	-0.201 (0.141)	0.209 (0.045)					
1K052701	SN	2	0.918 (0.106)	0.835 (0.073)	0.174 (0.025)					
1K053101	SN	7A	0.846 (0.041)	1.021 (0.037)	0.000 (0.000)	-0.074 (0.050)	0.074 (0.066)			
1K053102	SN	8A	1.061 (0.049)	0.914 (0.030)	0.000 (0.000)	0.762 (0.034)	-0.762 (0.057)			
1K053201	SN	9	1.463 (0.149)	1.035 (0.045)	0.105 (0.014)					

Table D-22 (continued)

IRT Parameters for Science Items

Physical Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
1K053301	SN	10	2.541 (0.207)	0.679 (0.029)	0.201 (0.014)					
1K053401	SN	11	0.521 (0.071)	0.309 (0.179)	0.238 (0.048)					
1K057501	ST	6A	0.349 (0.033)	1.896 (0.160)	0.000 (0.000)	0.167 (0.116)	-0.167 (0.184)			
1K058001	ST	11A	0.296 (0.030)	5.914 (0.206)	0.000 (0.000)	4.222 (0.125)	-4.222 (1.164)			
1K058101	ST	12	1.897 (0.206)	1.106 (0.055)	0.293 (0.017)					
1K058301	ST	14A	0.731 (0.044)	1.362 (0.050)	0.000 (0.000)	0.101 (0.067)	0.027 (0.104)	-0.128 (0.139)		
1K058601	SU	1	0.664 (0.076)	-0.497 (0.167)	0.245 (0.052)					
1K059001	SU	5A	0.203 (0.025)	-3.684 (0.420)	0.000 (0.000)	0.516 (0.372)	-0.516 (0.199)			
1K059101	SU	6A	0.545 (0.039)	2.643 (0.093)	0.000 (0.000)	1.643 (0.071)	-1.643 (0.293)			
1K059501	SU	10	1.988 (0.249)	2.063 (0.117)	0.091 (0.009)					

Table D-23

IRT Parameters for 1996 Science Items

Earth Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
2K040801	SE	0A	0.432 (0.034)	-1.567 (0.130)	0.000 (0.000)					
2K040802	SE	1A	0.545 (0.027)	-2.271 (0.097)	0.000 (0.000)	-1.361 (0.179)	1.361 (0.133)			
2K040808	SE	1G	0.652 (0.024)	-0.914 (0.040)	0.000 (0.000)	-1.273 (0.103)	1.273 (0.092)			
2K040809	SE	1M	0.644 (0.022)	-0.356 (0.032)	0.000 (0.000)	-1.363 (0.094)	1.363 (0.089)			
2K040803	SE	2A	0.540 (0.025)	-0.529 (0.043)	0.000 (0.000)	-0.239 (0.083)	0.239 (0.070)			
2K040804	SE	3A	0.952 (0.040)	0.598 (0.025)	0.000 (0.000)	-0.343 (0.052)	0.343 (0.055)			
2K040805	SE	4A	0.854 (0.035)	0.498 (0.027)	0.000 (0.000)	-0.627 (0.064)	0.627 (0.066)			
2K040806	SE	5A	1.020 (0.072)	0.681 (0.042)	0.000 (0.000)					
2K049801	SG	1	1.192 (0.105)	-1.823 (0.113)	0.218 (0.049)					
2K049802	SG	2A	0.446 (0.017)	-0.409 (0.045)	0.000 (0.000)	-1.443 (0.115)	1.443 (0.108)			
2K049803	SG	3	1.517 (0.152)	0.341 (0.054)	0.282 (0.024)					
2K049804	SG	4A	0.487 (0.037)	0.229 (0.065)	0.000 (0.000)					
2K049805	SG	5	0.653 (0.058)	-1.394 (0.170)	0.232 (0.053)					
2K049807	SG	7A	0.280 (0.009)	0.229 (0.043)	0.000 (0.000)	-4.008 (0.234)	0.649 (0.294)	3.360 (0.212)		
2K049809	SG	9A	0.974 (0.056)	1.239 (0.042)	0.000 (0.000)	0.203 (0.043)	-0.203 (0.068)			
2K049810	SG	10A	0.699 (0.028)	-0.668 (0.037)	0.000 (0.000)	-0.476 (0.077)	0.476 (0.066)			
2K089811	SG	11A	0.701 (0.049)	0.900 (0.063)	0.000 (0.000)					
2K049812	SG	12A	0.697 (0.064)	1.887 (0.136)	0.000 (0.000)					
2K049813	SG	13A	0.586 (0.034)	0.676 (0.043)	0.000 (0.000)	0.568 (0.061)	-0.568 (0.076)			
2K049814	SG	14A	0.712 (0.034)	0.985 (0.039)	0.000 (0.000)	-0.566 (0.069)	0.566 (0.081)			
2K049815	SG	15A	0.482 (0.033)	1.469 (0.070)	0.000 (0.000)	0.410 (0.084)	-0.022 (0.121)	-0.387 (0.180)		
2K049901	SI	1A	0.559 (0.029)	-0.675 (0.047)	0.000 (0.000)	0.128 (0.083)	-0.128 (0.066)			
2K049902	SI	2A	0.541 (0.030)	0.055 (0.041)	0.000 (0.000)	0.515 (0.071)	-0.515 (0.070)			
2K049903	SI	3A	0.632 (0.042)	0.413 (0.055)	0.000 (0.000)					
2K049904	SI	4A	0.855 (0.051)	0.440 (0.042)	0.000 (0.000)					
2K049905	SI	5	0.443 (0.051)	-2.088 (0.303)	0.264 (0.062)					
2K049906	SI	6	1.527 (0.214)	1.420 (0.087)	0.343 (0.016)					
2K049907	SI	7A	0.881 (0.050)	-0.702 (0.050)	0.000 (0.000)					
2K049908	SI	8A	0.991 (0.046)	0.554 (0.029)	0.000 (0.000)	0.699 (0.039)	-0.699 (0.049)			
2K049909	SI	9A	1.081 (0.057)	1.321 (0.034)	0.000 (0.000)	0.163 (0.044)	-0.073 (0.073)	-0.091 (0.098)		
2K049910	SI	10	0.890 (0.157)	1.431 (0.115)	0.255 (0.025)					
2K049911	SI	11A	0.561 (0.028)	0.752 (0.044)	0.000 (0.000)	-0.361 (0.075)	0.361 (0.087)			
2K050501	SJ	6A	0.563 (0.028)	1.227 (0.043)	0.000 (0.000)	0.536 (0.081)	0.980 (0.089)	-1.516 (0.161)		
2K050601	SJ	7	0.827 (0.117)	0.711 (0.095)	0.212 (0.032)					
2K050901	SJ	11A	1.055 (0.075)	2.872 (0.053)	0.000 (0.000)	1.897 (0.043)	-1.897 (0.808)			
2K051601	SK	4	1.134 (0.158)	0.789 (0.070)	0.226 (0.027)					
2K051701	SK	5A	0.847 (0.056)	0.295 (0.047)	0.000 (0.000)					
2K051801	SK	6A	0.244 (0.024)	1.352 (0.141)	0.000 (0.000)	0.814 (0.155)	-0.814 (0.205)			
2K047001	SL	3	0.649 (0.103)	0.177 (0.187)	0.325 (0.052)					
2K047301	SL	6A	0.533 (0.035)	0.341 (0.048)	0.000 (0.000)	0.565 (0.078)	-0.565 (0.085)			
2K047601	SL	9	1.176 (0.180)	1.463 (0.096)	0.108 (0.016)					
2K048301	SM	2	0.731 (0.076)	-0.854 (0.163)	0.248 (0.053)					
2K048701	SM	6	0.601 (0.080)	-0.224 (0.198)	0.279 (0.055)					
2K048801	SM	7	1.320 (0.215)	1.266 (0.084)	0.284 (0.021)					
2K049401	SM	13A	0.661 (0.037)	1.284 (0.053)	0.000 (0.000)	1.222 (0.060)	-1.222 (0.115)			
2K049402	SM	14A	0.460 (0.032)	0.111 (0.055)	0.000 (0.000)	0.722 (0.096)	-0.722 (0.094)			
2K052801	SN	3	0.452 (0.092)	1.318 (0.225)	0.302 (0.046)					
2K053001	SN	6A	0.621 (0.039)	2.494 (0.080)	0.000 (0.000)	1.332 (0.057)	-1.332 (0.219)			
2K053501	SN	12	2.342 (0.177)	1.001 (0.036)	0.267 (0.014)					

Table D-23 (continued)

IRT Parameters for Science Items
Earth Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
2K057101	ST	1	0.522 (0.063)	-1.263 (0.262)	0.286 (0.064)					
2K057401	ST	5A	0.524 (0.033)	-0.072 (0.048)	0.000 (0.000)	0.668 (0.084)	-0.668 (0.079)			
2K057901	ST	10	0.868 (0.108)	0.272 (0.108)	0.248 (0.038)					
2K058401	ST	15A	0.636 (0.036)	0.587 (0.042)	0.000 (0.000)	-0.236 (0.077)	0.236 (0.085)			
2K058701	SU	2	0.411 (0.057)	-0.831 (0.303)	0.277 (0.062)					
2K058901	SU	4	0.923 (0.134)	0.573 (0.095)	0.259 (0.033)					
2K059301	SU	8A	0.489 (0.030)	2.210 (0.114)	0.000 (0.000)	-2.005 (0.199)	2.077 (0.250)	-0.073 (0.304)		
2K059701	SU	12	0.710 (0.153)	1.596 (0.178)	0.232 (0.029)					
2K059801	SU	13A	0.824 (0.065)	1.688 (0.081)	0.000 (0.000)	0.363 (0.059)	-0.363 (0.126)			
2K059901	SU	14A	0.414 (0.016)	1.793 (0.050)	0.000 (0.000)	-1.452 (0.200)	4.458 (0.202)	-3.006 (0.293)		
2K060001	SU	15A	0.353 (0.029)	0.402 (0.071)	0.000 (0.000)	0.396 (0.118)	-0.396 (0.130)			
2K060101	SU	16A	0.278 (0.015)	1.403 (0.096)	0.000 (0.000)	2.841 (0.153)	-1.424 (0.191)	-1.416 (0.332)		
2K0494CL	SM		0.161 (0.008)	1.565 (0.087)	0.000 (0.000)	-14.767 (1.457)	11.377 (1.496)	3.015 (0.472)	1.278 (0.407)	-0.904 (0.461)

Table D-24

IRT Parameters for 1996 Science Items
Life Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
3K049504	SC	6A	0.644 (0.022)	-0.012 (0.029)	0.000 (0.000)	-0.938 (0.074)	0.938 (0.072)			
3K049505	SC	7A	0.699 (0.028)	-0.486 (0.033)	0.000 (0.000)	-0.252 (0.066)	0.252 (0.056)			
3K049506	SC	8A	0.699 (0.045)	2.357 (0.075)	0.000 (0.000)	1.147 (0.053)	-1.147 (0.199)			
3K041301	SH	1	0.646 (0.072)	-3.292 (0.309)	0.209 (0.057)					
3K041302	SH	2	0.889 (0.093)	-2.611 (0.209)	0.211 (0.055)					
3K041303	SH	3	0.650 (0.060)	-2.123 (0.194)	0.189 (0.051)					
3K041304	SH	4	0.470 (0.047)	-0.480 (0.163)	0.160 (0.042)					
3K041305	SH	5	1.436 (0.115)	-1.208 (0.076)	0.196 (0.040)					
3K041307	SH	7A	0.398 (0.027)	1.084 (0.073)	0.000 (0.000)	0.464 (0.084)	-0.464 (0.113)			
3K041401	SH	8A	0.494 (0.049)	2.128 (0.188)	0.000 (0.000)					
3K041402	SH	9A	0.947 (0.039)	0.999 (0.033)	0.000 (0.000)	1.180 (0.037)	-1.180 (0.073)			
3K041403	SH	10A	0.215 (0.017)	4.245 (0.226)	0.000 (0.000)	2.506 (0.145)	-2.506 (0.391)			
3K041404	SH	11A	0.395 (0.034)	-1.272 (0.127)	0.000 (0.000)					
3K041405	SH	12	0.636 (0.073)	0.275 (0.123)	0.188 (0.039)					
3K041406	SH	13A	0.459 (0.039)	2.313 (0.160)	0.000 (0.000)	0.093 (0.091)	-0.093 (0.177)			
3K050301	SJ	4	0.602 (0.117)	1.668 (0.184)	0.169 (0.031)					
3K051001	SJ	12A	0.393 (0.021)	-0.581 (0.061)	0.000 (0.000)	-0.975 (0.133)	0.975 (0.121)			
3K051002	SJ	13A	1.608 (0.096)	0.411 (0.030)	0.000 (0.000)					
3K051003	SJ	13G	1.252 (0.079)	0.568 (0.038)	0.000 (0.000)					
3K051004	SJ	13M	1.115 (0.078)	0.932 (0.051)	0.000 (0.000)					
3K051101	SJ	14A	0.260 (0.015)	1.386 (0.109)	0.000 (0.000)	-3.032 (0.229)	3.032 (0.255)			
3K051102	SJ	15A	0.854 (0.070)	1.942 (0.093)	0.000 (0.000)	0.364 (0.064)	-0.364 (0.149)			
3K051201	SJ	16A	0.388 (0.041)	2.413 (0.206)	0.000 (0.000)	0.438 (0.116)	-0.438 (0.233)			
3K051301	SK	1	0.831 (0.095)	0.004 (0.118)	0.236 (0.042)					
3K052001	SK	8	0.575 (0.157)	2.363 (0.343)	0.225 (0.030)					
3K052101	SK	9	0.779 (0.093)	0.367 (0.106)	0.194 (0.037)					
3K052201	SK	10	0.733 (0.160)	1.762 (0.182)	0.232 (0.028)					
3K052501	SK	14A	0.470 (0.026)	-0.356 (0.043)	0.000 (0.000)	0.150 (0.128)	0.503 (0.113)	-0.653 (0.093)		
3K052502	SK	15A	0.248 (0.018)	-3.430 (0.139)	0.000 (0.000)	3.542 (0.744)	-0.263 (0.229)	-3.279 (0.151)		
3K052503	SK	16A	0.213 (0.027)	-4.819 (0.484)	0.000 (0.000)	1.473 (0.526)	-1.473 (0.199)			
3K047501	SL	8	0.521 (0.110)	1.078 (0.212)	0.298 (0.049)					
3K047701	SL	10	1.007 (0.174)	1.606 (0.118)	0.154 (0.020)					
3K047801	SL	11	0.705 (0.095)	0.470 (0.124)	0.208 (0.040)					
3K048001	SL	13A	0.923 (0.038)	0.099 (0.043)	0.000 (0.000)	1.548 (0.061)	-1.548 (0.062)			
3K048101	SL	14A	0.382 (0.028)	1.480 (0.092)	0.000 (0.000)	0.567 (0.109)	-1.071 (0.189)	0.503 (0.245)		
3K048102	SL	15A	0.462 (0.057)	4.895 (0.279)	0.000 (0.000)	2.398 (0.115)	-2.398 (1.304)			
3K048103	SL	16A	0.580 (0.051)	-0.016 (0.071)	0.000 (0.000)					
3K048401	SM	3	0.703 (0.082)	-0.109 (0.141)	0.213 (0.047)					
3K048901	SM	8A	0.618 (0.037)	-0.750 (0.052)	0.000 (0.000)	0.303 (0.090)	-0.303 (0.068)			
3K049201	SM	11	0.354 (0.055)	-0.322 (0.314)	0.237 (0.060)					
3K049301	SM	12A	0.506 (0.044)	2.411 (0.178)	0.000 (0.000)	-0.387 (0.117)	0.387 (0.214)			
3K052901	SN	4A	0.441 (0018)	-0.644 (0.040)	0.000 (0.000)	-1.409 (0.156)	1.456 (0.148)	-0.047 (0.082)		
3K052902	SN	5	0.795 (0.070)	-1.586 (0.150)	0.211 (0.051)					
3K053601	SN	13A	0.422 (0.017)	1.005 (0.053)	0.000 (0.000)	2.328 (0.088)	-0.979 (0.100)	-1.349 (0.179)		
3K053701	SN	14A	0.472 (0.039)	2.441 (0.145)	0.000 (0.000)	0.682 (0.080)	-0.682 (0.194)			
3K053801	SN	15A	0.510 (0.021)	0.699 (0.042)	0.000 (0.000)	-1.335 (0.101)	1.335 (0.109)			
3K053901	SN	16A	0.652 (0.050)	2.129 (0.099)	0.000 (0.000)	0.664 (0.063)	-0.664 (0.163)			
3K054001	SO	1A	0.534 (0.032)	2.286 (0.050)	0.000 (0.000)	2.564 (0.078)	1.152 (0.088)	-3.715 (0.687)		
3K054002	SO	2A	0.930 (0.056)	1.548 (0.048)	0.000 (0.000)	0.948 (0.045)	-0.948 (0.116)			

Table D-24 (continued)
IRT Parameters for Science Items
Life Science, Grade 12

NAEP ID	Block	Item	aj (s.e.)	bj (s.e.)	cj (s.e.)	dj1 (s.e.)	dj2 (s.e.)	dj3 (s.e.)	dj4 (s.e.)	dj5 (s.e.)
3K054003	SO	3A	1.429 (0.148)	2.213 (0.097)	0.000 (0.000)	-0.342 (0.110)	0.342 (0.175)			
3K054004	SO	4A	0.714 (0.081)	2.246 (0.194)	0.000 (0.000)					
3K054005	SO	5A	0.438 (0.037)	2.566 (0.134)	0.000 (0.000)	1.292 (0.092)	-1.292 (0.252)			
3K054006	SO	6A	0.522 (0.071)	2.729 (0.311)	0.000 (0.000)					
3K054007	SO	7A	0.564 (0.046)	1.597 (0.094)	0.000 (0.000)	0.249 (0.081)	-0.249 (0.134)			
3K054008	SO	8A	0.415 (0.027)	1.641 (0.068)	0.000 (0.000)	0.518 (0.123)	1.334 (0.138)	-1.852 (0.255)		
3K057301	ST	3	0.444 (0.114)	2.372 (0.366)	0.199 (0.037)					
3K057302	ST	4	0.500 (0.091)	1.206 (0.185)	0.197 (0.043)					
3K057601	ST	7A	0.310 (0.025)	-2.374 (0.143)	0.000 (0.000)	1.578 (0.244)	-1.578 (0.117)			
3K057701	ST	8A	0.573 (0.051)	2.194 (0.139)	0.000 (0.000)	0.269 (0.084)	-0.269 (0.180)			
3K057801	ST	9	0.661 (0.071)	-0.205 (0.136)	0.189 (0.044)					
3K058501	ST	16A	0.582 (0.036)	1.336 (0.054)	0.000 (0.000)	1.499 (0.077)	-0.195 (0.099)	-1.304 (0.204)		
3K058801	SU	3	1.453 (0.144)	0.274 (0.054)	0.178 (0.026)					
3K059201	SU	7A	0.805 (0.043)	0.850 (0.033)	0.000 (0.000)	0.957 (0.054)	-0.067 (0.063)	-0.890 (0.100)		
3K059401	SU	9	0.755 (0.074)	-1.267 (0.154)	0.203 (0.051)					
3K059601	SU	11	1.184 (0.165)	0.834 (0.073)	0.265 (0.026)					

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Table D-25

IRT Parameters for the Reading Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N001101	0.594	(0.152)	1.629	(0.236)	0.358	(0.035)
N008601	1.728	(0.142)	-0.227	(0.053)	0.245	(0.027)
N008602	1.362	(0.119)	0.124	(0.053)	0.218	(0.026)
N008603	1.226	(0.105)	-0.259	(0.070)	0.223	(0.029)
N008701	0.548	(0.056)	-3.106	(0.311)	0.281	(0.065)
N001501	2.488	(0.243)	-0.508	(0.055)	0.329	(0.029)
N001502	2.331	(0.191)	0.319	(0.031)	0.222	(0.021)
N001503	2.140	(0.192)	-0.080	(0.047)	0.329	(0.027)
N001504	2.368	(0.204)	0.262	(0.034)	0.279	(0.023)
N001507	1.043	(0.138)	2.112	(0.194)	0.000	(0.000)
N001601	1.213	(0.123)	0.186	(0.065)	0.292	(0.028)
N001602	1.934	(0.193)	0.470	(0.040)	0.304	(0.022)
N001603	1.335	(0.201)	0.929	(0.062)	0.319	(0.023)
N001604	1.505	(0.176)	0.775	(0.045)	0.233	(0.021)
N008801	1.461	(0.137)	-0.839	(0.093)	0.318	(0.036)
N001801	0.334	(0.097)	6.427	(1.925)	0.144	(0.014)
N001802	2.334	(0.248)	1.461	(0.070)	0.203	(0.012)
N008901	1.835	(0.160)	-0.140	(0.051)	0.276	(0.027)
N008902	1.281	(0.123)	-0.204	(0.075)	0.304	(0.031)
N008905	0.156	(0.000)	15.358	(0.000)	0.000	(0.000)
N002001	2.113	(0.173)	0.884	(0.033)	0.197	(0.015)
N002002	1.582	(0.166)	0.675	(0.041)	0.220	(0.021)
N002003	1.619	(0.176)	0.568	(0.045)	0.289	(0.023)
N009001	1.762	(0.162)	0.518	(0.036)	0.190	(0.020)
N009002	1.645	(0.175)	0.679	(0.041)	0.221	(0.021)
N009003	1.659	(0.191)	1.105	(0.055)	0.240	(0.017)
N009004	2.304	(0.233)	0.471	(0.036)	0.313	(0.022)
N009101	0.933	(0.095)	-0.722	(0.132)	0.286	(0.042)
N009201	1.480	(0.145)	-0.594	(0.086)	0.330	(0.034)
N002101	1.519	(0.259)	1.569	(0.123)	0.236	(0.016)
N002102	2.003	(0.298)	1.679	(0.116)	0.163	(0.012)
N002702	1.702	(0.190)	0.809	(0.039)	0.190	(0.019)
N009601	0.863	(0.085)	-1.126	(0.165)	0.272	(0.052)
N002401	1.747	(0.170)	0.730	(0.035)	0.146	(0.017)
N009401	1.920	(0.162)	-0.257	(0.050)	0.245	(0.027)
N002801	3.165	(0.260)	0.261	(0.025)	0.179	(0.019)
N002802	2.501	(0.215)	0.182	(0.033)	0.220	(0.023)
N002804	0.662	(0.076)	1.665	(0.147)	0.000	(0.000)
N009701	1.231	(0.122)	0.246	(0.060)	0.256	(0.027)
N009702	1.867	(0.171)	0.286	(0.042)	0.273	(0.024)
N009703	2.056	(0.205)	0.673	(0.035)	0.274	(0.019)
N009704	1.936	(0.194)	0.683	(0.034)	0.201	(0.018)
N009705	1.755	(0.155)	0.193	(0.044)	0.264	(0.024)
N003001	0.970	(0.257)	1.971	(0.262)	0.195	(0.019)
N003002	0.525	(0.085)	0.663	(0.150)	0.219	(0.041)
N003003	0.081	(0.018)	14.651	(3.865)	0.032	(0.010)
N014001	1.414	(0.138)	0.083	(0.060)	0.283	(0.028)
N003101	1.392	(0.146)	0.149	(0.062)	0.300	(0.028)
N003102	3.430	(0.222)	0.686	(0.023)	0.199	(0.015)
N003104	0.869	(0.138)	2.355	(0.280)	0.000	(0.000)
N009801	1.224	(0.121)	-1.584	(0.151)	0.337	(0.054)
N009901	1.091	(0.115)	0.043	(0.079)	0.296	(0.032)
N014301	3.051	(0.257)	0.310	(0.026)	0.243	(0.019)
N014302	1.658	(0.161)	0.464	(0.042)	0.248	(0.023)
N014303	2.697	(0.229)	0.067	(0.033)	0.271	(0.023)

Table D-25 (continued)

IRT Parameters for the Reading Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N010002	1.783	(0.173)	0.191	(0.049)	0.326	(0.026)
N010003	1.940	(0.165)	0.210	(0.039)	0.234	(0.023)
N010102	1.881	(0.219)	0.661	(0.042)	0.292	(0.022)
N010103	2.171	(0.188)	0.072	(0.040)	0.261	(0.025)
N003701	1.266	(0.135)	-0.042	(0.078)	0.327	(0.032)
N003702	1.990	(0.190)	0.403	(0.038)	0.240	(0.023)
N003704	0.731	(0.073)	1.196	(0.091)	0.000	(0.000)
N003801	1.287	(0.395)	1.892	(0.267)	0.345	(0.018)
N003802	0.511	(0.086)	0.499	(0.176)	0.259	(0.046)
N003803	1.130	(0.341)	2.034	(0.299)	0.228	(0.017)
N010301	0.656	(0.070)	-1.167	(0.215)	0.291	(0.057)
N010201	0.954	(0.092)	-1.367	(0.166)	0.303	(0.053)
N004101	1.292	(0.127)	-0.134	(0.075)	0.316	(0.032)
N004201	1.546	(0.205)	0.926	(0.052)	0.263	(0.021)
N004202	1.113	(0.190)	1.015	(0.082)	0.314	(0.026)
N010401	0.703	(0.077)	-0.817	(0.175)	0.262	(0.049)
N010402	1.642	(0.207)	0.899	(0.049)	0.255	(0.020)
N010403	1.612	(0.205)	1.119	(0.061)	0.233	(0.018)
N004701	2.232	(0.185)	0.400	(0.030)	0.190	(0.019)
N004702	1.016	(0.121)	0.167	(0.089)	0.339	(0.033)
N004703	1.977	(0.165)	0.318	(0.035)	0.216	(0.021)
N004801	1.232	(0.123)	-0.314	(0.087)	0.340	(0.034)
N004901	2.143	(0.185)	0.980	(0.039)	0.250	(0.015)
N005101	0.743	(0.068)	-1.734	(0.202)	0.281	(0.060)
N010801	1.208	(0.131)	0.407	(0.060)	0.252	(0.027)
N010902	2.336	(0.232)	0.531	(0.033)	0.258	(0.020)
N010903	2.951	(0.249)	0.322	(0.027)	0.198	(0.019)
N010904	2.415	(0.212)	0.653	(0.031)	0.257	(0.019)
N014101	0.980	(0.108)	-0.014	(0.092)	0.257	(0.034)
N011001	1.653	(0.112)	0.277	(0.034)	0.293	(0.018)
N011002	2.323	(0.153)	0.574	(0.022)	0.267	(0.014)
N011003	2.619	(0.158)	0.019	(0.025)	0.287	(0.017)
N011004	2.453	(0.145)	0.341	(0.021)	0.228	(0.015)
N011101	2.248	(0.136)	0.405	(0.022)	0.218	(0.014)
N011201	1.441	(0.116)	0.604	(0.035)	0.264	(0.017)
N011301	2.159	(0.137)	0.292	(0.026)	0.279	(0.016)
N011302	1.528	(0.142)	0.647	(0.038)	0.347	(0.018)
N011401	2.891	(0.180)	1.102	(0.032)	0.392	(0.011)
N011402	1.010	(0.126)	0.944	(0.061)	0.297	(0.021)
N011403	2.055	(0.156)	1.132	(0.039)	0.297	(0.011)
N011404	1.869	(0.139)	1.051	(0.034)	0.214	(0.012)
N013201	2.445	(0.196)	0.203	(0.031)	0.234	(0.021)
N013301	1.657	(0.164)	-0.361	(0.072)	0.416	(0.030)
N013401	1.676	(0.154)	0.581	(0.036)	0.183	(0.019)
N013402	2.405	(0.225)	0.240	(0.037)	0.355	(0.023)
N013403	2.556	(0.219)	0.553	(0.027)	0.234	(0.017)
N014201	1.325	(0.130)	0.042	(0.065)	0.334	(0.028)
N014501	0.687	(0.041)	-0.625	(0.062)	0.000	(0.000)
N014502	0.635	(0.036)	-0.341	(0.065)	0.000	(0.000)
N014502	0.718	(0.058)	-0.738	(0.088)	0.000	(0.000)
N014503	0.824	(0.045)	-1.253	(0.071)	0.000	(0.000)

Table D-26

IRT Parameters for the Reading Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N001101	0.221	(0.038)	0.647	(0.397)	0.290	(0.048)
N001201	0.537	(0.108)	1.467	(0.191)	0.336	(0.037)
N001202	1.548	(0.162)	0.812	(0.046)	0.241	(0.018)
N001301	0.633	(0.091)	0.151	(0.192)	0.433	(0.045)
N001302	0.598	(0.075)	-2.213	(0.345)	0.528	(0.070)
N001303	0.894	(0.100)	0.588	(0.082)	0.246	(0.029)
N001401	0.919	(0.087)	-0.173	(0.100)	0.273	(0.038)
N001501	2.067	(0.183)	-1.655	(0.077)	0.271	(0.048)
N001502	1.414	(0.108)	-0.684	(0.065)	0.214	(0.033)
N001503	1.124	(0.089)	-1.196	(0.101)	0.233	(0.045)
N001504	1.260	(0.098)	-0.746	(0.077)	0.226	(0.036)
N001507	0.536	(0.048)	2.054	(0.158)	0.000	(0.000)
N001601	0.336	(0.044)	-1.237	(0.371)	0.286	(0.066)
N001602	0.865	(0.076)	-1.473	(0.160)	0.286	(0.060)
N001603	0.749	(0.091)	-0.010	(0.146)	0.343	(0.045)
N001604	0.766	(0.069)	-0.560	(0.127)	0.235	(0.045)
N001701	0.692	(0.066)	-0.819	(0.162)	0.265	(0.052)
N001702	0.807	(0.187)	2.399	(0.253)	0.249	(0.018)
N001703	0.693	(0.067)	-0.283	(0.130)	0.227	(0.043)
N001801	0.128	(0.035)	11.783	(3.143)	0.050	(0.013)
N001802	1.001	(0.117)	0.753	(0.073)	0.264	(0.026)
N001901	0.781	(0.080)	0.007	(0.112)	0.235	(0.039)
N001904	0.805	(0.000)	0.242	(0.000)	0.000	(0.000)
N002001	0.995	(0.078)	-0.167	(0.071)	0.170	(0.030)
N002002	1.095	(0.100)	-0.150	(0.082)	0.284	(0.034)
N002003	0.943	(0.081)	-0.674	(0.108)	0.254	(0.043)
N002101	0.703	(0.110)	1.336	(0.116)	0.223	(0.029)
N002102	1.227	(0.117)	0.824	(0.049)	0.144	(0.018)
N002201	0.958	(0.000)	-0.393	(0.061)	0.195	(0.029)
N002202	0.980	(0.099)	-0.560	(0.125)	0.347	(0.046)
N002203	0.483	(0.049)	-1.986	(0.267)	0.265	(0.062)
N002401	0.800	(0.060)	-0.904	(0.108)	0.153	(0.041)
N002501	0.533	(0.059)	0.026	(0.160)	0.211	(0.045)
N002701	0.706	(0.085)	0.462	(0.112)	0.235	(0.037)
N002801	1.255	(0.098)	-1.143	(0.089)	0.217	(0.042)
N002802	1.276	(0.104)	-1.412	(0.099)	0.230	(0.047)
N002804	0.340	(0.000)	2.103	(0.000)	0.000	(0.000)
N002902	0.564	(0.056)	-1.336	(0.222)	0.274	(0.061)
N002903	1.325	(0.112)	-0.745	(0.083)	0.285	(0.039)
N002904	0.891	(0.081)	-0.272	(0.100)	0.238	(0.038)
N002905	0.570	(0.070)	0.426	(0.145)	0.223	(0.041)
N002906	1.186	(0.094)	-0.829	(0.085)	0.228	(0.039)
N003001	0.669	(0.095)	1.313	(0.111)	0.170	(0.028)
N003002	0.292	(0.039)	-0.126	(0.291)	0.179	(0.052)
N003003	1.841	(0.209)	2.355	(0.118)	0.091	(0.007)
N003101	1.080	(0.091)	-1.113	(0.111)	0.256	(0.048)
N003102	1.489	(0.121)	-0.418	(0.062)	0.258	(0.031)
N003104	0.569	(0.047)	1.758	(0.125)	0.000	(0.000)
N003201	0.876	(0.075)	-0.919	(0.125)	0.246	(0.047)
N003202	0.973	(0.087)	0.155	(0.073)	0.194	(0.029)
N003203	1.243	(0.125)	0.308	(0.066)	0.306	(0.027)
N003204	1.049	(0.103)	0.408	(0.068)	0.228	(0.027)
N003301	0.772	(0.070)	-0.573	(0.126)	0.233	(0.045)
N003401	0.999	(0.085)	-0.251	(0.082)	0.198	(0.034)
N003501	0.809	(0.078)	-0.530	(0.131)	0.268	(0.046)

Table D-26 (continued)

IRT Parameters for the Reading Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N003601	0.934	(0.081)	-1.243	(0.134)	0.261	(0.052)
N003602	0.977	(0.082)	-0.350	(0.086)	0.205	(0.035)
N003701	0.814	(0.073)	-0.885	(0.135)	0.245	(0.049)
N003702	1.107	(0.112)	-0.107	(0.089)	0.315	(0.036)
N003704	0.596	(0.043)	0.105	(0.059)	0.000	(0.000)
N003801	0.329	(0.059)	1.324	(0.279)	0.199	(0.051)
N003802	0.248	(0.035)	-1.477	(0.413)	0.198	(0.059)
N003803	0.419	(0.113)	3.034	(0.489)	0.243	(0.031)
N004002	0.508	(0.051)	-2.289	(0.268)	0.265	(0.063)
N003901	1.095	(0.112)	-2.541	(0.162)	0.256	(0.061)
N004101	0.947	(0.081)	-1.588	(0.145)	0.272	(0.058)
N004201	0.865	(0.081)	-0.079	(0.097)	0.237	(0.037)
N004202	0.638	(0.074)	-0.078	(0.158)	0.274	(0.047)
N004301	1.058	(0.106)	0.288	(0.075)	0.276	(0.030)
N004303	0.859	(0.051)	0.222	(0.041)	0.000	(0.000)
N004401	1.505	(0.146)	-2.244	(0.116)	0.265	(0.060)
N004402	0.810	(0.073)	-0.247	(0.106)	0.215	(0.039)
N004403	1.269	(0.110)	-1.673	(0.116)	0.268	(0.055)
N004501	0.600	(0.083)	0.307	(0.170)	0.316	(0.046)
N004502	0.628	(0.059)	-0.957	(0.174)	0.250	(0.053)
N004601	0.844	(0.082)	0.224	(0.087)	0.204	(0.032)
N004602	1.020	(0.087)	-0.184	(0.080)	0.231	(0.033)
N004603	1.279	(0.104)	-0.539	(0.074)	0.263	(0.035)
N004605	0.655	(0.042)	-1.096	(0.078)	0.000	(0.000)
N004701	1.585	(0.118)	-0.800	(0.059)	0.187	(0.031)
N004702	0.752	(0.062)	-1.296	(0.144)	0.228	(0.051)
N004703	0.853	(0.063)	-1.176	(0.108)	0.183	(0.041)
N004801	1.131	(0.093)	-1.351	(0.112)	0.250	(0.049)
N004901	0.795	(0.077)	-0.077	(0.107)	0.239	(0.038)
N005101	0.697	(0.066)	-2.475	(0.220)	0.265	(0.063)
N005001	1.312	(0.310)	2.234	(0.221)	0.259	(0.016)
N005002	0.664	(0.155)	2.083	(0.233)	0.331	(0.026)
N005003	0.950	(0.174)	2.096	(0.163)	0.170	(0.016)
N005201	0.676	(0.164)	1.391	(0.212)	0.578	(0.030)
N005202	0.459	(0.065)	0.432	(0.205)	0.245	(0.050)
N005203	1.074	(0.232)	1.989	(0.166)	0.329	(0.017)
N005301	0.903	(0.091)	-0.092	(0.100)	0.265	(0.037)
N005302	1.792	(0.172)	0.630	(0.039)	0.190	(0.018)
N005303	0.860	(0.129)	0.966	(0.101)	0.294	(0.029)
N005304	1.766	(0.162)	0.185	(0.046)	0.236	(0.023)
N005305	0.989	(0.099)	-0.716	(0.123)	0.293	(0.047)
N005403	1.119	(0.102)	-0.629	(0.102)	0.330	(0.042)
N005404	1.101	(0.098)	-1.432	(0.131)	0.293	(0.056)
N005405	1.633	(0.143)	0.092	(0.051)	0.299	(0.025)
N005406	0.902	(0.081)	-0.312	(0.101)	0.248	(0.039)
N005407	1.339	(0.110)	-0.483	(0.071)	0.271	(0.034)
N005503	0.832	(0.100)	0.425	(0.104)	0.308	(0.035)
N005504	1.157	(0.129)	0.998	(0.059)	0.201	(0.019)
N005505	0.952	(0.092)	-0.874	(0.139)	0.334	(0.052)
N005601	1.405	(0.128)	-0.519	(0.079)	0.350	(0.036)
N005602	1.352	(0.129)	0.536	(0.052)	0.237	(0.022)
N005603	1.475	(0.132)	-0.385	(0.071)	0.339	(0.033)

Table D-27

IRT Parameters for the Reading Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N017001	1.474	(0.141)	0.014	(0.063)	0.331	(0.029)
N017002	1.717	(0.160)	0.465	(0.044)	0.239	(0.021)
N017003	1.698	(0.170)	1.348	(0.059)	0.230	(0.014)
N001301	1.071	(0.147)	-0.065	(0.133)	0.569	(0.036)
N001302	0.663	(0.093)	-2.474	(0.384)	0.592	(0.068)
N001303	0.910	(0.089)	-0.237	(0.103)	0.268	(0.039)
N001401	0.709	(0.076)	-1.101	(0.196)	0.318	(0.058)
N001501	1.527	(0.165)	-2.116	(0.118)	0.261	(0.053)
N001502	1.643	(0.139)	-1.079	(0.070)	0.194	(0.034)
N001503	1.173	(0.108)	-1.675	(0.129)	0.265	(0.052)
N001504	1.339	(0.117)	-1.155	(0.091)	0.239	(0.040)
N001507	0.358	(0.042)	2.182	(0.241)	0.000	(0.000)
N001701	0.621	(0.064)	-1.558	(0.223)	0.294	(0.061)
N001702	0.588	(0.169)	3.082	(0.514)	0.308	(0.022)
N001703	0.940	(0.098)	-0.612	(0.131)	0.348	(0.046)
N001901	0.981	(0.093)	-0.927	(0.124)	0.288	(0.047)
N001904	0.748	(0.049)	-1.258	(0.081)	0.000	(0.000)
N002001	1.268	(0.111)	-0.471	(0.075)	0.250	(0.035)
N002002	0.983	(0.087)	-0.794	(0.105)	0.231	(0.042)
N002003	1.183	(0.113)	-1.174	(0.116)	0.294	(0.047)
N002101	0.614	(0.070)	0.190	(0.129)	0.173	(0.041)
N002102	1.538	(0.130)	0.113	(0.049)	0.197	(0.025)
N002201	1.181	(0.000)	-0.908	(0.077)	0.389	(0.041)
N002202	1.657	(0.202)	-0.718	(0.099)	0.516	(0.040)
N002203	0.431	(0.057)	-3.349	(0.441)	0.291	(0.065)
N002501	0.451	(0.064)	-0.441	(0.288)	0.328	(0.062)
N002701	0.736	(0.070)	-0.369	(0.118)	0.185	(0.042)
N002702	0.819	(0.072)	-0.973	(0.129)	0.194	(0.047)
N002801	1.488	(0.150)	-1.764	(0.115)	0.272	(0.052)
N002802	1.152	(0.115)	-2.047	(0.154)	0.291	(0.059)
N002804	0.202	(0.033)	2.784	(0.450)	0.000	(0.000)
N002902	0.648	(0.071)	-1.386	(0.227)	0.320	(0.063)
N002903	1.604	(0.162)	-1.199	(0.095)	0.305	(0.044)
N002904	1.136	(0.103)	-0.828	(0.100)	0.267	(0.042)
N002905	0.658	(0.079)	0.118	(0.141)	0.249	(0.043)
N002906	1.747	(0.181)	-1.081	(0.087)	0.327	(0.042)
N003001	1.000	(0.095)	0.414	(0.066)	0.159	(0.027)
N003002	0.301	(0.041)	-0.708	(0.312)	0.185	(0.055)
N003003	1.528	(0.154)	1.291	(0.052)	0.089	(0.011)
N003101	0.943	(0.090)	-1.727	(0.162)	0.284	(0.057)
N003102	1.270	(0.117)	-1.172	(0.104)	0.254	(0.045)
N003104	0.754	(0.054)	1.057	(0.068)	0.000	(0.000)
N003201	0.934	(0.092)	-1.821	(0.175)	0.298	(0.060)
N003202	1.172	(0.117)	-0.722	(0.106)	0.345	(0.043)
N003203	0.910	(0.082)	-0.615	(0.107)	0.225	(0.041)
N003204	1.069	(0.095)	-0.988	(0.107)	0.244	(0.043)
N003301	1.153	(0.100)	-1.165	(0.103)	0.224	(0.043)
N015201	0.707	(0.070)	-2.188	(0.215)	0.274	(0.060)
N003501	0.688	(0.067)	-1.041	(0.163)	0.248	(0.051)
N003601	1.087	(0.105)	-1.839	(0.150)	0.275	(0.056)
N003602	1.226	(0.114)	-0.815	(0.095)	0.270	(0.042)
N003701	0.663	(0.073)	-1.445	(0.226)	0.315	(0.063)
N003702	1.573	(0.151)	-0.535	(0.072)	0.326	(0.036)
N003704	0.664	(0.047)	-0.441	(0.063)	0.000	(0.000)
N003801	0.570	(0.084)	0.576	(0.156)	0.228	(0.045)

Table D-27 (continued)

IRT Parameters for the Reading Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N003802	0.184	(0.033)	-2.639	(0.654)	0.199	(0.059)
N003803	0.652	(0.155)	1.842	(0.217)	0.313	(0.031)
N016001	0.978	(0.095)	-0.877	(0.124)	0.285	(0.047)
N016002	0.885	(0.119)	0.495	(0.109)	0.340	(0.036)
N016003	0.870	(0.093)	-0.109	(0.111)	0.284	(0.040)
N016004	1.309	(0.126)	-0.428	(0.082)	0.322	(0.037)
N016005	1.416	(0.128)	-0.410	(0.071)	0.275	(0.035)
N016006	0.881	(0.086)	-0.088	(0.096)	0.224	(0.037)
N004201	0.895	(0.093)	-0.477	(0.123)	0.288	(0.045)
N004202	0.685	(0.090)	-0.043	(0.164)	0.319	(0.048)
N004301	0.891	(0.096)	-0.339	(0.119)	0.270	(0.043)
N004303	0.673	(0.054)	-0.092	(0.065)	0.000	(0.000)
N015502	1.250	(0.110)	-0.310	(0.074)	0.275	(0.034)
N015503	1.218	(0.113)	0.128	(0.066)	0.257	(0.029)
N015504	1.220	(0.107)	-0.403	(0.078)	0.268	(0.035)
N015505	0.654	(0.064)	-0.944	(0.167)	0.252	(0.050)
N004501	0.668	(0.072)	-0.631	(0.168)	0.280	(0.051)
N004502	0.493	(0.054)	-2.025	(0.285)	0.288	(0.063)
N004601	0.826	(0.077)	-0.149	(0.097)	0.206	(0.036)
N004602	1.502	(0.129)	-0.553	(0.066)	0.247	(0.034)
N004603	1.335	(0.121)	-0.883	(0.089)	0.273	(0.040)
N004605	0.749	(0.054)	-1.265	(0.093)	0.000	(0.000)
N005001	1.980	(0.209)	0.743	(0.041)	0.251	(0.018)
N005002	0.812	(0.100)	0.613	(0.098)	0.252	(0.033)
N005003	0.895	(0.120)	1.264	(0.085)	0.150	(0.022)
N004901	0.850	(0.094)	-0.552	(0.147)	0.359	(0.049)
N005201	0.769	(0.158)	0.585	(0.202)	0.635	(0.035)
N005202	0.533	(0.077)	0.327	(0.189)	0.284	(0.049)
N005203	0.757	(0.142)	1.296	(0.134)	0.338	(0.031)
N015901	1.270	(0.135)	0.118	(0.078)	0.363	(0.032)
N015902	1.198	(0.123)	0.205	(0.074)	0.299	(0.031)
N015903	2.076	(0.196)	0.518	(0.037)	0.201	(0.019)
N015905	0.728	(0.000)	0.247	(0.000)	0.000	(0.000)
N005503	0.742	(0.094)	0.032	(0.146)	0.350	(0.044)
N005504	1.381	(0.137)	0.345	(0.060)	0.294	(0.026)
N005505	0.786	(0.078)	-1.926	(0.207)	0.309	(0.064)
N015101	1.022	(0.117)	0.150	(0.097)	0.369	(0.035)
N015102	2.671	(0.226)	0.004	(0.032)	0.227	(0.021)
N015103	2.693	(0.229)	0.110	(0.030)	0.210	(0.020)
N015104	2.168	(0.191)	-0.027	(0.041)	0.275	(0.025)

Table D-28

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2709011	0.59950	0.03694	-2.84371	0.14206	0.00000	0.00000
N2774011	0.91059	0.05279	-1.73828	0.09895	0.17174	0.04417
N2676011	1.16597	0.06386	-0.69400	0.06026	0.22100	0.02978
N2768011	0.69953	0.04740	-3.21047	0.16225	0.00000	0.00000
N2768021	0.58482	0.03237	-2.33512	0.10902	0.00000	0.00000
N2768031	0.54214	0.02503	-0.05625	0.03920	0.00000	0.00000
N2507011	0.64744	0.03759	-1.41456	0.11571	0.14224	0.04151
N2507021	1.13106	0.07160	0.48798	0.03863	0.15349	0.01635
N2507031	1.01455	0.05179	-0.49314	0.05496	0.11757	0.02566
N2622011	0.72079	0.05486	-0.72016	0.13738	0.31391	0.04583
N2572011	0.93291	0.05708	-0.71528	0.08508	0.24537	0.03633
N2761011	1.03200	0.03885	-1.02631	0.03378	0.00000	0.00000
N2861011	0.88563	0.03357	-0.87547	0.03512	0.00000	0.00000
N2700011	0.57662	0.02578	-0.66154	0.04489	0.00000	0.00000
N2721021	0.81734	0.04941	-0.47932	0.08147	0.17124	0.03313
N2840011	0.79395	0.03102	-0.84005	0.03760	0.00000	0.00000
N2840021	0.75296	0.04204	1.87866	0.07965	0.00000	0.00000
N2676021	1.00823	0.05478	-0.13182	0.05033	0.15327	0.02205
N2625011	0.46201	0.05964	0.29971	0.21852	0.34233	0.04846
N2625021	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2654011	0.47952	0.13882	3.46971	0.57466	0.28410	0.01985
N2661011	0.57237	0.07755	1.35985	0.10758	0.24159	0.02796
N2691011	0.50012	0.07249	1.52585	0.12337	0.19987	0.03081
N2682011	0.95788	0.07476	0.62152	0.05230	0.21573	0.01992
N2521011	0.68677	0.09376	1.62183	0.09947	0.23094	0.02074
N2526011	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2723012	0.77379	0.05260	-2.44300	0.14599	0.17087	0.05028
N2766012	1.16928	0.06842	-1.14011	0.07632	0.22568	0.04110
N2578012	0.64050	0.04461	-1.39460	0.16037	0.26842	0.05431
N2634012	0.77485	0.05443	-1.25946	0.14323	0.30576	0.05417
N2634022	0.90833	0.06814	-0.42377	0.10049	0.32971	0.03773
N2735012	0.62232	0.05145	-0.93564	0.18471	0.32768	0.05576
N2754012	0.98503	0.03665	-0.85998	0.03191	0.00000	0.00000
N2775012	0.77063	0.03025	-0.68815	0.03564	0.00000	0.00000
N2776012	0.84989	0.03313	-0.91905	0.03691	0.00000	0.00000
N2776022	0.83584	0.03107	-0.03557	0.02749	0.00000	0.00000
N2776032	0.79308	0.03006	-0.21771	0.02949	0.00000	0.00000
N2614012	0.41818	0.03423	-0.73342	0.19602	0.21652	0.04786
N2506012	0.93796	0.05858	-1.97101	0.10891	0.17798	0.04849
N2506022	0.57587	0.03736	-1.88859	0.15604	0.17040	0.05013
N2506032	0.95856	0.05149	-0.25672	0.05505	0.12352	0.02461
N2514012	0.70587	0.04081	-0.80890	0.09514	0.14658	0.03691
N2509012	0.48879	0.03297	-1.81552	0.17006	0.15974	0.04796
N2509022	1.09953	0.06793	0.42731	0.04018	0.14315	0.01701
N2509032	1.18622	0.06456	-0.06436	0.04272	0.13661	0.02045
N2503012	0.72341	0.08481	1.05275	0.08474	0.29008	0.02497
N2760012	0.95855	0.03648	-0.95870	0.03430	0.00000	0.00000
N2760022	0.83677	0.03543	1.01588	0.03830	0.00000	0.00000
N2861022	0.90443	0.03271	0.01609	0.02577	0.00000	0.00000
N2711012	0.73684	0.02885	-0.23597	0.03139	0.00000	0.00000
N2520012	1.13023	0.12554	1.77819	0.07829	0.22868	0.01093
N2690012	0.59892	0.10854	2.99976	0.29445	0.08071	0.01225
N2768213	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2768223	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000

Table D-28 (continued)

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2768233	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2840213	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2840223	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2760213	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2760223	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2776213	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2776223	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2776233	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2682213	0.00000	0.00000	-0.10734	0.00000	0.00000	0.00000
N2728013	0.89213	0.05271	-1.60990	0.10228	0.18525	0.04618
N2670013	0.94882	0.05918	-1.37676	0.10407	0.26707	0.04720
N2721013	0.76836	0.05370	-0.95164	0.12834	0.28977	0.04748
N2624013	0.80162	0.07726	0.52062	0.08431	0.31390	0.02743
N2585013	0.56937	0.08584	1.68734	0.12176	0.22902	0.02593

Table D-29

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2819011	1.14166	0.08519	-2.21322	0.11766	0.22337	0.04755
N2546011	0.84076	0.06375	-2.06860	0.15938	0.32730	0.05643
N2768011	0.50147	0.04175	-4.32401	0.30550	0.00000	0.00000
N2768021	0.50356	0.03968	-4.07409	0.27292	0.00000	0.00000
N2768031	0.40041	0.02485	-2.04391	0.12367	0.00000	0.00000
N2776011	0.68977	0.03973	-2.61117	0.11894	0.00000	0.00000
N2776021	0.68283	0.03180	-1.49505	0.06217	0.00000	0.00000
N2776031	0.61362	0.03160	-1.91585	0.08601	0.00000	0.00000
N2672011	1.01261	0.07773	-0.80989	0.11129	0.43931	0.04191
N2862011	0.96660	0.05721	-0.84701	0.08097	0.25278	0.03707
N2509011	0.35161	0.03194	-3.57131	0.34026	0.18338	0.05197
N2509021	0.86649	0.04567	-0.89285	0.07248	0.13528	0.03282
N2509031	0.82089	0.05250	-2.08095	0.12354	0.15468	0.04439
N2624011	1.15737	0.07332	-0.47616	0.06661	0.30845	0.03123
N2748011	1.36812	0.11261	0.27123	0.05497	0.45473	0.02029
N2652021	0.71187	0.05409	-0.67179	0.13437	0.31397	0.04560
N2668011	0.68302	0.04711	-1.17426	0.13837	0.28919	0.04765
N2529011	1.21576	0.06143	-0.09054	0.03787	0.12643	0.01933
N2625011	0.54813	0.04319	-1.15266	0.18669	0.31206	0.05227
N2625021	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2576011	1.26554	0.04386	-0.58253	0.02262	0.00000	0.00000
N2652011	0.67316	0.05615	-2.35874	0.22164	0.35331	0.06308
N2739011	1.58900	0.08805	-0.08173	0.03413	0.21782	0.01910
N2588011	1.18663	0.10308	0.67807	0.05399	0.37648	0.01843
N2631011	0.64190	0.02742	-0.56523	0.03824	0.00000	0.00000
N2659011	0.76359	0.06972	0.94217	0.06987	0.22197	0.02236
N2521011	0.98805	0.08716	0.46445	0.07017	0.36614	0.02419
N2750011	0.86228	0.03310	0.69449	0.03058	0.00000	0.00000
N2601011	1.51040	0.08872	-0.09785	0.03903	0.23718	0.02132
N2690011	1.18736	0.06881	0.02047	0.04434	0.18630	0.02171
N2863011	1.30556	0.07778	0.34034	0.03658	0.20346	0.01687
N2546021	0.94949	0.08998	1.16354	0.05776	0.24036	0.01713
N2610011	0.68078	0.05390	0.32732	0.08902	0.21317	0.03023
N2865011	0.92314	0.06419	0.78062	0.04668	0.13451	0.01724
N2789041	0.65447	0.07568	1.46561	0.08759	0.19367	0.02217
N2557011	1.02120	0.06648	0.76744	0.04130	0.13699	0.01524
N2831011	1.98595	0.11576	0.93254	0.02435	0.14242	0.00858
N2774012	0.55830	0.04494	-3.39203	0.25203	0.19018	0.05347
N2779012	0.69697	0.04398	-3.06832	0.14847	0.00000	0.00000
N2779022	0.70057	0.04447	-3.09463	0.15011	0.00000	0.00000
N2779032	0.67984	0.03835	-2.53712	0.11356	0.00000	0.00000
N2634012	0.72108	0.05722	-2.71701	0.20373	0.28011	0.05922
N2634022	0.64681	0.04723	-2.10054	0.18187	0.28513	0.05652
N2507012	0.49809	0.04120	-3.73340	0.28311	0.13432	0.04782
N2507022	0.80945	0.04387	-1.36855	0.08799	0.14301	0.03659
N2507032	0.55562	0.03849	-2.83807	0.18703	0.12102	0.04294
N2561012	0.90472	0.03943	-1.51745	0.05110	0.00000	0.00000
N2622012	0.48839	0.04072	-1.69723	0.24206	0.32053	0.06053
N2502012	0.57688	0.04537	-1.48973	0.20035	0.31995	0.05791
N2703012	0.39105	0.03095	-2.32292	0.25011	0.15751	0.05437
N2703022	1.35410	0.09816	1.71969	0.05047	0.08018	0.00648
N2537012	0.29752	0.03037	-0.93216	0.26762	0.31463	0.04325
N2866012	0.92129	0.03326	-0.27410	0.02565	0.00000	0.00000
N2866022	0.91481	0.03328	-0.38613	0.02677	0.00000	0.00000

Table D-29 (continued)

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2866032	1.09784	0.03926	0.60353	0.02417	0.00000	0.00000
N2691012	0.93222	0.06083	-0.26860	0.07405	0.24378	0.03130
N2857012	0.86784	0.07362	0.12916	0.08873	0.35170	0.03047
N2822012	1.08773	0.07855	0.48265	0.05013	0.27691	0.01954
N2789022	0.92484	0.08581	0.91405	0.06106	0.27922	0.02003
N2635012	0.92296	0.04735	-0.11892	0.04787	0.09969	0.02117
N2588022	1.40917	0.08526	0.29574	0.03525	0.22132	0.01693
N2789012	1.32488	0.08361	0.13825	0.04266	0.26789	0.02004
N2647012	1.07150	0.06803	0.32213	0.04605	0.20016	0.01983
N2615012	0.63407	0.04418	-0.86457	0.13403	0.24133	0.04502
N2618012	0.59496	0.04898	-0.12107	0.12959	0.25620	0.03943
N2616012	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2613012	0.52460	0.05706	1.13531	0.10523	0.17028	0.02948
N2612012	0.62164	0.10539	2.17167	0.16058	0.24185	0.02005
N2814012	0.72502	0.10315	2.14540	0.13231	0.16744	0.01496
N2520012	0.98749	0.07661	0.58809	0.05498	0.25292	0.02083
N2588032	1.46701	0.10537	0.95767	0.03386	0.19433	0.01194
N2789032	1.88578	0.12786	0.80740	0.02750	0.22164	0.01115
N2865022	1.01183	0.06869	1.01892	0.04089	0.10150	0.01280
N2692012	0.90312	0.04330	1.68434	0.05771	0.00000	0.00000
N2768213	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2768223	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2768233	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806213	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806223	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806233	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806243	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806253	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2806263	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2789213	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2645213	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2599213	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2789233	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2789223	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2789253	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2789243	0.00000	0.00000	-0.11006	0.00000	0.00000	0.00000
N2753013	0.32096	0.02984	-2.49410	0.32055	0.20248	0.05623
N2822023	1.16158	0.08450	-0.31459	0.07300	0.37877	0.03067
N2661013	0.83754	0.05917	-0.66475	0.10688	0.30429	0.04122
N2540013	0.89809	0.05678	-0.52647	0.08167	0.22012	0.03549
N2699013	0.77154	0.05560	-0.43978	0.10526	0.27645	0.03869
N2565013	1.28677	0.09122	0.32289	0.04610	0.29533	0.01980
N2659023	0.76494	0.09719	1.39971	0.08804	0.30157	0.02119
N2568013	1.31502	0.09495	0.46865	0.04327	0.28610	0.01807

Table D-30

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2561011	0.79491	0.04311	-2.20982	0.08772	0.00000	0.00000
N2606011	1.34667	0.06412	-1.70690	0.04401	0.00000	0.00000
N2624011	0.99863	0.06306	-1.49109	0.10305	0.25117	0.05003
N2588041	0.77466	0.05655	-2.23284	0.16806	0.26626	0.06341
N2860011	0.77406	0.04238	-1.25574	0.09080	0.14979	0.03848
N2860021	0.98452	0.05540	-1.72376	0.08688	0.13072	0.04205
N2857011	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2863021	0.93379	0.05727	-0.95066	0.09019	0.24177	0.04096
N2785011	0.89587	0.03431	-0.75799	0.03220	0.00000	0.00000
N2785021	0.91341	0.03334	-0.32812	0.02674	0.00000	0.00000
N2785031	0.73752	0.03016	-0.77553	0.03796	0.00000	0.00000
N2588021	1.61427	0.09376	-0.47732	0.04245	0.24547	0.02510
N2546021	1.23038	0.06548	-0.43454	0.04751	0.16243	0.02526
N2599011	0.88206	0.05936	-0.23800	0.08061	0.23007	0.03306
N2871011	1.09599	0.06619	-0.59405	0.06787	0.24571	0.03281
N2703011	0.79357	0.05233	-2.31065	0.13649	0.15273	0.05089
N2703021	1.23893	0.05782	-0.22615	0.03493	0.08123	0.01757
N2557011	1.20628	0.06659	-1.06349	0.06334	0.19375	0.03513
N2543011	0.94198	0.06977	0.02816	0.07569	0.27980	0.02958
N2865021	1.35117	0.06894	-0.49347	0.04182	0.14970	0.02354
N2609011	1.67439	0.08737	-0.21545	0.03166	0.17280	0.01842
N2568011	1.19200	0.07693	-0.48209	0.06609	0.30551	0.03125
N2588031	1.16183	0.06826	-0.11321	0.04989	0.19059	0.02408
N2626011	0.71586	0.05636	0.23733	0.09052	0.21434	0.03145
N2539011	1.27296	0.07183	-0.50724	0.05195	0.21597	0.02767
N2539021	0.68407	0.07353	0.33672	0.13250	0.37471	0.03661
N2539031	0.97734	0.07560	0.38247	0.06450	0.29387	0.02356
N2539041	1.60610	0.12066	0.45194	0.04055	0.37398	0.01608
N2630011	0.63484	0.02811	0.85767	0.04419	0.00000	0.00000
N2789051	0.56862	0.06637	1.05364	0.11226	0.22750	0.03187
N2873011	0.67899	0.02795	0.39321	0.03417	0.00000	0.00000
N2873021	0.78625	0.03117	0.69872	0.03406	0.00000	0.00000
N2643011	0.81348	0.03464	1.21058	0.04413	0.00000	0.00000
N2828011	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2511011	1.19012	0.04410	0.91059	0.02739	0.00000	0.00000
N2546012	1.01954	0.07885	-2.47842	0.14197	0.23942	0.05824
N2668012	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2623012	0.59455	0.04634	-1.38437	0.19974	0.28418	0.06366
N2632012	0.74713	0.05476	-1.66485	0.16535	0.34067	0.05986
N2632022	0.79125	0.06335	-0.77153	0.14160	0.38347	0.04787
N2601012	1.23905	0.07225	-1.39281	0.07222	0.20711	0.04085
N2540012	0.85834	0.05622	-1.11846	0.11377	0.24266	0.04961
N2690012	1.72750	0.10979	-0.25555	0.04099	0.30837	0.02264
N2789012	0.95891	0.05614	-0.73878	0.07703	0.20365	0.03609
N2615012	0.66473	0.04366	-2.09292	0.14828	0.19419	0.05189
N2618012	0.54161	0.03672	-1.47640	0.16169	0.20938	0.05067
N2612012	0.49101	0.04376	0.02825	0.15874	0.21235	0.04344
N2616012	0.77994	0.12183	1.78405	0.10980	0.34878	0.01845
N2613012	0.48799	0.03928	0.14487	0.13050	0.15626	0.03714
N2814012	0.48840	0.06089	1.62588	0.12025	0.15176	0.02779
N2804012	0.57974	0.02681	-0.93122	0.05039	0.00000	0.00000
N2590012	1.00534	0.03568	-0.30252	0.02469	0.00000	0.00000
N2871022	0.99647	0.05467	-0.90878	0.07107	0.18005	0.03498
N2863012	0.96169	0.05614	-0.97244	0.08183	0.21935	0.03854

Table D-30 (continued)

IRT Parameters for the Mathematics Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N2865012	1.20266	0.07136	-1.01036	0.07055	0.21977	0.03858
N2625012	0.52646	0.04288	-1.55908	0.22589	0.34264	0.06068
N2625022	1.16549	0.11963	1.40031	0.05547	0.27011	0.01300
N2631012	0.70471	0.02979	-0.90810	0.04225	0.00000	0.00000
N2588012	1.30308	0.08950	-0.39955	0.06397	0.34481	0.03014
N2647012	1.22357	0.06770	-0.39538	0.04980	0.19564	0.02577
N2610012	0.79100	0.05004	-0.46191	0.08873	0.20633	0.03544
N2517012	0.83140	0.05163	-0.45041	0.08232	0.16674	0.03513
N2789022	1.01373	0.06788	-0.33627	0.07507	0.26713	0.03280
N2608012	1.38183	0.04597	0.04373	0.01893	0.00000	0.00000
N2789032	1.22774	0.07459	-0.17532	0.05132	0.23410	0.02498
N2556012	1.88440	0.12169	1.47987	0.04369	0.34624	0.00923
N2553012	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2689012	1.65811	0.09139	0.31535	0.02827	0.17930	0.01355
N2688012	1.29277	0.08393	1.14930	0.03461	0.08848	0.00897
N2558012	0.78131	0.03773	1.68142	0.06260	0.00000	0.00000
N2768213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2768223	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2768233	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806223	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806233	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806243	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806253	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2806263	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2789213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2599213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2645213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2789223	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2853213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2789233	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2789253	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2789243	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2643213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2679213	0.00000	0.00000	-0.08216	0.00000	0.00000	0.00000
N2665013	0.84796	0.05965	-0.49696	0.09867	0.26261	0.03943
N2713013	1.18593	0.07920	-0.08152	0.05709	0.27857	0.02573
N2555013	0.84856	0.06714	0.20441	0.08097	0.26643	0.02942
N2560013	1.06035	0.03815	-0.23860	0.02407	0.00000	0.00000
N2571013	0.55500	0.10663	2.24410	0.18757	0.28961	0.02426

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Table D-31

IRT Parameters for the Science Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4000011	0.56311	0.04528	-1.64856	0.21563	0.33365	0.05239
N4002011	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4003011	0.73474	0.07142	-0.04423	0.10970	0.44352	0.02722
N4004011	0.91803	0.07765	-1.40966	0.14896	0.50831	0.03655
N4004021	1.87737	0.12423	-0.78651	0.04697	0.35748	0.02081
N4004031	0.59447	0.05294	-2.05406	0.26837	0.49484	0.05512
N4004041	1.32191	0.09209	-0.66275	0.06400	0.40014	0.02282
N4004051	0.68599	0.05778	-0.98284	0.15213	0.40990	0.03660
N4005011	0.49172	0.06112	0.44668	0.15774	0.37533	0.03338
N4001011	1.04274	0.16668	1.50077	0.09544	0.51612	0.01490
N4001021	0.80641	0.10779	1.25531	0.09690	0.45069	0.01892
N4006011	0.81545	0.06826	0.02681	0.08091	0.35528	0.02445
N4007011	1.17303	0.08376	0.43991	0.04365	0.29307	0.01686
N4009011	0.28543	0.05136	1.82967	0.28756	0.34420	0.03575
N4010011	0.54419	0.05162	0.52351	0.09799	0.21851	0.02659
N4011011	0.31592	0.06357	1.67353	0.28317	0.39704	0.03904
N4012011	0.86721	0.14000	2.06877	0.13179	0.25864	0.01377
N4013011	0.50247	0.06336	0.73835	0.13570	0.33332	0.03104
N4015012	0.60132	0.11386	1.65079	0.16694	0.50029	0.02241
N4016012	0.63757	0.05684	-1.07525	0.17994	0.38394	0.04347
N4017012	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4017022	0.24744	0.05649	2.48785	0.53721	0.56905	0.02796
N4017032	0.33532	0.08283	1.93238	0.35540	0.53545	0.03489
N4018012	1.25686	0.12124	0.02366	0.06987	0.57864	0.01960
N4018022	1.41914	0.14693	-0.13923	0.07391	0.64604	0.01901
N4018032	0.99172	0.11152	0.23069	0.09425	0.61889	0.02030
N4018042	0.79316	0.10869	1.14505	0.10423	0.50150	0.01971
N4019012	0.45144	0.09207	2.08817	0.22929	0.37678	0.02702
N4020012	0.75743	0.06220	-1.10947	0.14555	0.41553	0.03714
N4020022	0.74744	0.06182	-1.30157	0.16076	0.43260	0.03994
N4020032	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4020042	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4020052	0.75333	0.07617	-0.24187	0.12563	0.50283	0.02860
N4021012	0.79414	0.06765	-0.12558	0.09179	0.36789	0.02683
N4022012	0.28829	0.03549	0.00296	0.28100	0.31156	0.04313
N4024012	0.57455	0.14920	2.78002	0.36401	0.36424	0.01848
N4025012	1.12771	0.12103	1.54349	0.06302	0.22499	0.01247
N4026012	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4026022	0.42732	0.00000	0.20889	0.21005	0.57496	0.02669
N4026032	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4027012	0.67834	0.07849	1.50002	0.09391	0.22729	0.01861
N4028012	1.56082	0.10903	1.59177	0.04767	0.18587	0.00827
N4029012	0.42670	0.12550	4.05322	0.75787	0.20262	0.01740
N4030013	0.37776	0.05055	-6.77791	0.78455	0.30681	0.06678
N4031013	0.43931	0.04297	-5.26217	0.44242	0.30033	0.06564
N4032013	0.46770	0.03235	-2.74544	0.24330	0.25768	0.05764
N4032023	0.33750	0.03072	-1.34363	0.28629	0.25354	0.05200
N4033013	0.54311	0.04199	-1.32947	0.18259	0.27452	0.04526
N4034013	0.43217	0.05913	0.50716	0.19391	0.37455	0.03766
N4035013	0.48962	0.05891	0.11979	0.18035	0.39951	0.03640
N4035023	0.53233	0.04765	-2.33567	0.30546	0.48334	0.05966
N4035033	0.34337	0.05306	0.31740	0.30122	0.46663	0.04182
N4036013	0.80150	0.07147	0.72634	0.06735	0.28030	0.02053
N4037013	3.50307	0.00000	-0.31270	0.02007	0.39230	0.01571

Table D-31 (continued)

IRT Parameters for the Science Long-Term Trend Samples, Age 9

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4037023	3.35457	0.00000	-0.35879	0.02368	0.48618	0.01644
N4037033	3.75914	0.29325	-0.24694	0.02539	0.39095	0.01599
N4038013	0.46127	0.09380	1.89190	0.21792	0.43910	0.02715
N4038023	0.00000	0.00000	-0.13604	0.00000	0.00000	0.00000
N4038033	0.48779	0.05494	-0.90377	0.26483	0.47288	0.04632
N4038043	0.40332	0.05095	-0.35973	0.27889	0.42061	0.04644
N4039013	0.60614	0.04973	-0.46523	0.12440	0.26422	0.03363
N4040013	0.23197	0.03052	1.09308	0.26634	0.24042	0.03499
N4042013	0.49011	0.05656	1.24827	0.10759	0.18109	0.02513

Table D-32

IRT Parameters for the Science Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4045011	0.85565	0.05351	-2.31702	0.13739	0.25274	0.05922
N4046011	0.48238	0.04925	-0.18754	0.19754	0.28356	0.04856
N4047011	0.76049	0.05044	-1.56840	0.15228	0.29493	0.05606
N4047021	0.63359	0.06098	0.24217	0.11615	0.28737	0.03444
N4002011	0.44659	0.03463	-1.83850	0.24816	0.28313	0.06071
N4049011	0.76399	0.04971	-0.59825	0.09727	0.22707	0.03502
N4049021	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4049031	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4048011	0.98001	0.08233	-1.68271	0.17682	0.52180	0.05700
N4048021	1.72682	0.10676	-0.29858	0.03993	0.33931	0.02046
N4048031	1.44376	0.10451	0.47822	0.04162	0.37175	0.01667
N4050011	0.79237	0.08030	0.63614	0.08311	0.36227	0.02502
N4051011	0.84401	0.07120	0.92283	0.05519	0.19584	0.01849
N4052011	0.57024	0.08018	0.85935	0.13560	0.37345	0.03399
N4053011	0.86595	0.09949	1.20749	0.06828	0.30316	0.01896
N4054011	1.11274	0.10370	1.21835	0.04767	0.21978	0.01388
N4012011	1.05210	0.07084	0.11518	0.05553	0.28190	0.02237
N4055011	1.19018	0.09090	0.48914	0.04989	0.35287	0.01874
N4056011	0.75155	0.12998	1.57379	0.11259	0.40943	0.02075
N4057011	0.91242	0.06034	0.39984	0.05042	0.17925	0.01980
N4058011	1.40936	0.11938	1.08156	0.03773	0.24713	0.01264
N4059011	1.23781	0.11235	1.51164	0.05485	0.21477	0.01054
N4060011	0.95940	0.23629	2.92186	0.37582	0.14820	0.00821
N4061011	1.45895	0.21427	2.38895	0.17170	0.20091	0.00728
N4062011	1.42854	0.13555	2.13437	0.09698	0.11224	0.00615
N4063012	0.56698	0.12571	1.23073	0.20393	0.63128	0.02801
N4063022	0.33217	0.03749	-1.02640	0.30926	0.47909	0.04298
N4063032	0.87581	0.08037	0.15703	0.09174	0.41952	0.02785
N4063042	0.61305	0.11679	1.45169	0.14544	0.47125	0.02676
N4064012	1.01093	0.11089	0.26178	0.09749	0.59402	0.02311
N4064022	1.25122	0.10057	0.26081	0.05741	0.43891	0.02068
N4064032	1.05340	0.11479	-0.65178	0.14583	0.66547	0.03147
N4064042	1.24445	0.10721	-0.19117	0.07711	0.53874	0.02447
N4064052	1.12918	0.09414	-0.26500	0.08321	0.49278	0.02701
N4065012	0.77587	0.07101	0.74893	0.06857	0.23083	0.02331
N4066012	0.49248	0.05082	-0.74990	0.25283	0.33634	0.05996
N4067012	1.08533	0.09700	0.60897	0.05964	0.38486	0.02013
N4068012	0.80242	0.06583	-1.58961	0.19118	0.46833	0.05768
N4068022	0.45650	0.08969	1.05124	0.23627	0.51134	0.03882
N4068032	0.67738	0.05493	-0.79811	0.15474	0.36254	0.04490
N4068042	0.72057	0.05593	-1.06937	0.15734	0.37972	0.04753
N4068052	1.56880	0.15222	1.23170	0.05582	0.54283	0.01132
N4068062	0.38666	0.04667	0.11822	0.23608	0.41368	0.04088
N4069012	0.70690	0.07138	0.21753	0.11532	0.35851	0.03352
N4070012	0.42021	0.06919	1.04549	0.19917	0.30418	0.04493
N4071012	0.82574	0.11961	1.97283	0.12033	0.14310	0.01384
N4072012	0.80020	0.08809	0.85388	0.07954	0.34212	0.02395
N4073012	0.44487	0.05355	0.81371	0.14998	0.21455	0.03776
N4073022	0.89255	0.17304	1.78441	0.12771	0.40733	0.01704
N4080012	1.43693	0.10586	0.91884	0.03441	0.20692	0.01292
N4076012	0.73803	0.09443	1.33781	0.08332	0.26370	0.02176
N4075012	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4077012	0.76949	0.08684	1.28984	0.07242	0.21377	0.01990
N4078012	1.36883	0.14211	1.82767	0.08538	0.30380	0.00966

Table D-32 (continued)

IRT Parameters for the Science Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4079012	0.52343	0.07264	1.07908	0.12737	0.27277	0.03386
N4082012	1.03478	0.13878	1.93198	0.10689	0.20136	0.01125
N4083013	1.23038	0.10140	0.75319	0.04690	0.34605	0.01656
N4083023	0.69316	0.05783	-1.22132	0.19190	0.44143	0.05245
N4083033	0.68206	0.07183	-0.97399	0.23439	0.55134	0.05057
N4083043	0.97872	0.07871	-1.03037	0.13047	0.47376	0.04153
N4084013	0.38108	0.03850	-0.29704	0.22413	0.31768	0.04454
N4085013	0.78391	0.05808	-0.70055	0.12049	0.30595	0.04111
N4085023	0.54303	0.06703	1.10800	0.10546	0.21805	0.03013
N4086013	0.45875	0.03460	-1.12937	0.19781	0.18206	0.05332
N4087013	0.31063	0.03907	0.68616	0.22743	0.35566	0.03556
N4088013	0.28896	0.03712	0.93120	0.23154	0.33292	0.03391
N4089013	1.37529	0.15554	0.81009	0.06066	0.56976	0.01544
N4089023	0.87551	0.07293	-1.75233	0.19560	0.50879	0.06031
N4089033	0.92821	0.08601	0.52585	0.07281	0.40329	0.02255
N4089043	0.78548	0.13029	1.39005	0.10563	0.47551	0.02051
N4090013	0.47751	0.03562	-0.41157	0.14261	0.17657	0.03902
N4091013	0.79425	0.05241	-1.35261	0.13641	0.28649	0.05089
N4091023	0.75910	0.07188	0.36214	0.09339	0.34899	0.02856
N4091033	0.85745	0.15687	1.83667	0.12733	0.35671	0.01667
N4092013	0.76617	0.09905	1.01019	0.09027	0.40541	0.02393
N4093013	0.88858	0.06127	-0.07622	0.07132	0.24851	0.02722
N4094013	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4094023	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4094033	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000
N4095013	0.98168	0.11349	1.67834	0.07436	0.14850	0.01220
N4096013	1.34898	0.12250	1.15736	0.04273	0.28859	0.01297
N4097013	1.33892	0.11657	1.75686	0.06749	0.20768	0.00874
N4098013	0.00000	0.00000	-0.01344	0.00000	0.00000	0.00000

Table D-33

IRT Parameters for the Science Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4002011	0.48961	0.04025	-2.80462	0.25554	0.24478	0.05804
N4046011	0.36941	0.03406	-1.65536	0.28311	0.25768	0.05745
N4100011	0.00000	0.00000	-0.05246	0.00000	0.00000	0.00000
N4100021	0.00000	0.00000	-0.05246	0.00000	0.00000	0.00000
N4100031	0.24892	0.03601	-4.23989	0.73728	0.46308	0.06551
N4100041	0.52243	0.06168	-0.86993	0.28723	0.56137	0.05027
N4099011	0.84051	0.06004	-0.88321	0.11818	0.29998	0.04496
N4086011	0.33388	0.03027	-2.69910	0.31234	0.18504	0.05437
N4093011	0.81322	0.05208	-1.39173	0.11897	0.22096	0.04809
N4063011	1.15843	0.12861	0.24633	0.08882	0.60036	0.02252
N4063021	0.30049	0.03490	-1.40400	0.34079	0.43034	0.04610
N4063031	0.89335	0.08335	-0.17972	0.11360	0.47337	0.03321
N4063041	0.48559	0.05506	-0.40659	0.24253	0.43123	0.04958
N4101011	0.70132	0.07329	-0.91459	0.21985	0.54313	0.05078
N4101021	0.32474	0.03823	-1.24174	0.33313	0.47067	0.04557
N4101031	0.35253	0.03945	-1.52347	0.33548	0.46857	0.04938
N4066011	0.37313	0.03196	-2.20500	0.27163	0.20399	0.05572
N4050011	0.44223	0.04925	-0.25826	0.23159	0.32492	0.05137
N4012011	0.89779	0.06517	-0.42039	0.09336	0.30911	0.03533
N4052011	0.62688	0.08429	0.70083	0.13071	0.35856	0.03581
N4102011	0.80127	0.10396	1.53016	0.08655	0.22590	0.01826
N4060011	0.75794	0.12904	2.00914	0.14467	0.21074	0.01721
N4095011	0.70233	0.06980	1.11159	0.06951	0.14791	0.02139
N4061011	1.40936	0.11459	1.48896	0.05064	0.18525	0.00961
N4103011	0.00000	0.00000	-0.05246	0.00000	0.00000	0.00000
N4062011	1.19643	0.11440	1.54744	0.05618	0.10057	0.00949
N4081011	0.65487	0.08758	1.55297	0.09689	0.18004	0.02221
N4064012	0.97961	0.08256	-0.50930	0.11104	0.47105	0.03587
N4064022	1.01256	0.07403	-0.70145	0.09797	0.40396	0.03663
N4064032	1.13816	0.09419	-1.44138	0.12954	0.50314	0.04808
N4064042	1.17028	0.08626	-1.07980	0.10004	0.44047	0.04070
N4064052	1.01346	0.07506	-1.24200	0.11888	0.42634	0.04533
N4104012	0.22079	0.03114	0.25036	0.30688	0.34747	0.03659
N4068012	0.77902	0.06708	-2.11823	0.20115	0.45913	0.05877
N4068022	0.28668	0.04220	1.03988	0.27208	0.41353	0.03338
N4068032	0.76462	0.06229	-1.19911	0.16460	0.43715	0.05001
N4068042	0.64284	0.05192	-1.84614	0.20103	0.40048	0.05618
N4068052	0.55830	0.08251	0.55399	0.18465	0.46707	0.03855
N4068062	0.37129	0.04441	-0.13503	0.25009	0.43904	0.04098
N4105012	0.34812	0.02922	-0.84915	0.19391	0.15372	0.04173
N4106012	2.22456	0.10967	1.13627	0.02537	0.15519	0.00800
N4106022	0.50555	0.04949	-2.75735	0.32733	0.43501	0.06644
N4106032	1.47739	0.15215	1.01873	0.04812	0.42845	0.01415
N4106042	0.46553	0.04541	-2.39292	0.32611	0.43134	0.06484
N4069012	0.53496	0.04910	-0.60142	0.19111	0.27961	0.05223
N4074012	0.42679	0.04499	-0.78513	0.25679	0.43222	0.04798
N4074022	0.00000	0.00000	-0.05246	0.00000	0.00000	0.00000
N4074032	0.57936	0.06571	-0.20359	0.20025	0.43983	0.04578
N4074042	0.62038	0.05274	-2.12497	0.22815	0.41582	0.05960
N4072012	0.64225	0.07151	0.24853	0.13791	0.32865	0.03981
N4070012	0.34630	0.03289	-0.74863	0.23552	0.20844	0.04850
N4107012	0.92935	0.08270	0.71901	0.05909	0.25772	0.02116
N4077012	0.74941	0.06744	0.75671	0.06816	0.18867	0.02360
N4073012	0.29677	0.03616	0.78352	0.21737	0.24971	0.03662

Table D-33 (continued)

IRT Parameters for the Science Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.
N4073022	1.12228	0.15435	1.24211	0.06961	0.43463	0.01659
N4071012	1.09467	0.10061	1.11265	0.04738	0.19397	0.01508
N4108012	0.36698	0.05452	1.25953	0.19833	0.24071	0.04055
N4109012	0.99808	0.07345	1.02010	0.04294	0.10964	0.01313
N4110012	1.15590	0.10938	1.31821	0.04953	0.16157	0.01247
N4083013	1.04277	0.07523	-0.56072	0.08889	0.39743	0.03349
N4083023	0.72177	0.05706	-1.87014	0.18998	0.42565	0.05679
N4083033	0.81542	0.06677	-1.82696	0.18344	0.46994	0.05657
N4083043	0.99883	0.07591	-1.72258	0.13779	0.43647	0.05176
N4051013	1.07687	0.07790	0.17801	0.05752	0.29439	0.02324
N4089013	0.85016	0.06708	-1.06585	0.14279	0.45301	0.04537
N4089023	1.31265	0.11069	-1.80596	0.11932	0.47345	0.05059
N4089033	0.75710	0.07022	0.07180	0.11031	0.38320	0.03274
N4089043	0.52642	0.05685	-0.06095	0.18789	0.37462	0.04400
N4054013	0.85491	0.06394	0.57100	0.05480	0.16494	0.02102
N4113013	0.61534	0.17737	3.49267	0.58316	0.14062	0.01258
N4055013	0.66249	0.05133	-0.50176	0.12988	0.27312	0.04182
N4111013	0.51607	0.04614	-0.19342	0.15665	0.21546	0.04430
N4112013	0.73900	0.06302	0.20167	0.09177	0.25667	0.03143
N4088013	0.90586	0.08028	-0.01962	0.09598	0.40462	0.03125
N4114013	1.66500	0.10158	0.32959	0.03048	0.23200	0.01539
N4115013	1.13488	0.09250	1.08760	0.04262	0.16938	0.01344
N4115023	0.81636	0.05719	-1.06192	0.12631	0.31610	0.04668
N4116013	1.45694	0.10553	0.85804	0.03283	0.20082	0.01280
N4117013	1.24097	0.09496	0.92225	0.03803	0.18924	0.01388
N4118013	1.70366	0.10004	0.35988	0.02810	0.20134	0.01434
N4119013	1.48805	0.12300	1.06898	0.03600	0.22053	0.01207
N4120013	1.24929	0.12664	1.56534	0.06351	0.25507	0.01119

Table D-34

IRT Parameters for the Writing Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.						
N000602	0.36651	(0.02371)	0.51596	(0.08441)	0.00000	(0.00000)	-2.68951	(0.26912)	2.68951	(0.27808)		
N000902	0.41662	(0.04319)	1.14182	(0.11692)	0.00000	(0.00000)	0.48668	(0.13421)	-0.48668	(0.18668)		
N001002	0.37714	(0.03090)	3.79628	(0.11933)	0.00000	(0.00000)	5.34927	(0.18034)	1.65147	(0.19992)	-7.00073	(4.05221)
N014702	0.44906	(0.03827)	-0.43632	(0.08358)	0.00000	(0.00000)	1.13570	(0.14650)	-1.13570	(0.12413)		
N014802	0.57651	(0.04540)	2.09404	(0.06560)	0.00000	(0.00000)	2.37907	(0.10206)	1.13180	(0.11476)	-3.51087	(0.76353)

Table D-35

IRT Parameters for the Writing Long-Term Trend Samples, Age 13

NAEP ID	A	S.E.	B	S.E.	C	S.E.	D_1	S.E.	D_2	S.E.	D_3	S.E.
N000302	0.59039	(0.03926)	2.28368	(0.06026)	0.00000	(0.00000)	2.01394	(0.05980)	0.33111	(0.10132)	-2.34505	(0.43066)
N000402	0.34942	(0.01642)	2.65597	(0.07769)	0.00000	(0.00000)	4.71621	(0.09981)	-0.40379	(0.13682)	-4.31241	(0.77416)
N000502	0.42991	(0.02755)	2.09379	(0.08824)	0.00000	(0.00000)	3.56807	(0.13571)	0.24860	(0.14711)	-3.81667	(0.76763)
N000602	0.33489	(0.02235)	-1.26329	(0.11353)	0.00000	(0.00000)	-2.93379	(0.31131)	2.93379	(0.28540)		
N000902	0.22140	(0.02760)	0.67603	(0.15377)	0.00000	(0.00000)	1.17276	(0.23770)	-1.17276	(0.27279)		
N001002	0.41631	(0.02718)	1.02522	(0.09952)	0.00000	(0.00000)	4.15537	(0.22916)	0.80894	(0.12603)	-4.96431	(0.57892)

Table D-36

IRT Parameters for the Writing Long-Term Trend Samples, Age 17

NAEP ID	A	S.E.	B	S.E.	C	S.E.	D_1	S.E.	D_2	S.E.	D_3	S.E.
N000302	0.83643	(0.05744)	1.27782	(0.04947)	0.00000	(0.00000)	1.64131	(0.07066)	0.15671	(0.08572)	-1.79802	(0.24158)
N000402	0.48474	(0.02925)	1.37052	(0.08257)	0.00000	(0.00000)	3.14935	(0.13641)	-0.20194	(0.13089)	-2.94741	(0.44601)
N001002	0.28394	(0.01458)	1.13085	(0.10048)	0.00000	(0.00000)	4.42878	(0.27680)	1.79798	(0.16501)	-6.22679	(0.61443)
N018002	0.52217	(0.02337)	1.10691	(0.05142)	0.00000	(0.00000)	2.83766	(0.11281)	0.13049	(0.09807)	-2.96815	(0.37941)
N019002	0.29003	(0.01223)	1.27894	(0.08918)	0.00000	(0.00000)	1.69286	(0.25116)	4.25545	(0.19860)	-5.94830	(0.50467)
N021002	0.76397	(0.03919)	1.19581	(0.03578)	0.00000	(0.00000)	1.71834	(0.06548)	0.32928	(0.07684)	-2.04763	(0.29654)

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Appendix E

ESTIMATION ERROR VARIANCE BY GENDER AND RACE/ETHNICITY

Table E-1

Estimation Error Variance for the Main Mathematics Number Sense, Properties, and Operations Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
GRADE 4			
Total	0.88	0.91	0.09
Male	1.33	0.89	0.11
Female	1.10	0.85	0.15
White	1.13	0.89	0.11
Black	7.31	0.93	0.07
Hispanic	4.49	0.89	0.11
Asian American	17.64	0.89	0.11
American Indian	6.49	0.78	0.22
Other	53.12	0.76	0.24
GRADE 8			
Total	1.18	0.91	0.09
Male	1.89	0.88	0.12
Female	1.30	0.85	0.15
White	1.48	0.91	0.09
Black	4.99	0.83	0.17
Hispanic	3.58	0.76	0.24
Asian American	15.24	0.79	0.21
American Indian	11.79	0.79	0.21
Other	505.74	0.94	0.06
GRADE 12			
Total	1.27	0.93	0.07
Male	1.73	0.88	0.12
Female	1.53	0.91	0.09
White	1.12	0.91	0.09
Black	5.82	0.87	0.13
Hispanic	3.51	0.77	0.23
Asian American	27.19	0.92	0.08
American Indian	111.35	0.96	0.04
Other	141.65	0.89	0.11

Table E-2

Estimation Error Variance for the Main Mathematics Measurement Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
GRADE 4			
Total	1.25	0.84	0.16
Male	1.75	0.78	0.22
Female	1.61	0.77	0.23
White	1.63	0.84	0.16
Black	5.59	0.75	0.25
Hispanic	6.39	0.77	0.23
Asian American	24.93	0.77	0.23
American Indian	7.36	0.75	0.25
Other	128.73	0.87	0.13
GRADE 8			
Total	2.06	0.87	0.13
Male	3.30	0.86	0.14
Female	2.52	0.78	0.22
White	2.58	0.87	0.13
Black	7.81	0.77	0.23
Hispanic	9.43	0.74	0.26
Asian American	29.03	0.72	0.28
American Indian	20.90	0.79	0.21
Other	249.71	0.78	0.22
GRADE 12			
Total	1.25	0.84	0.16
Male	1.78	0.69	0.31
Female	1.78	0.82	0.18
White	1.39	0.80	0.20
Black	5.34	0.72	0.28
Hispanic	5.25	0.65	0.35
Asian American	38.41	0.85	0.15
American Indian	138.38	0.94	0.06
Other	101.64	0.84	0.16

Table E-3

Estimation Error Variance for the Main Mathematics Geometry and Spatial Sense Scale

		Proportion of Variance Due to . . .	
	Total Variance	**Student Sampling**	**Latency of θ**
GRADE 4			
Total	0.77	0.82	0.18
Male	1.15	0.79	0.21
Female	1.02	0.74	0.26
White	0.92	0.79	0.21
Black	3.21	0.66	0.34
Hispanic	4.26	0.84	0.16
Asian American	20.33	0.82	0.18
American Indian	6.45	0.73	0.27
Other	72.49	0.75	0.25
GRADE 8			
Total	1.10	0.91	0.09
Male	1.73	0.85	0.15
Female	1.39	0.82	0.18
White	1.32	0.88	0.12
Black	4.73	0.84	0.16
Hispanic	6.10	0.85	0.15
Asian American	15.43	0.78	0.22
American Indian	13.65	0.76	0.24
Other	221.87	0.86	0.14
GRADE 12			
Total	1.12	0.88	0.12
Male	1.44	0.82	0.18
Female	1.51	0.87	0.13
White	1.38	0.86	0.14
Black	5.92	0.83	0.17
Hispanic	5.85	0.84	0.16
Asian American	20.32	0.82	0.18
American Indian	67.86	0.91	0.09
Other	140.13	0.91	0.09

Table E-4

Estimation Error Variance for the Main Mathematics Data Analysis, Statistics, and Probability Scale

		Proportion of Variance Due to . . .	
	Total Variance	**Student Sampling**	**Latency of θ**
GRADE 4			
Total	1.28	0.87	0.13
Male	1.61	0.79	0.21
Female	1.78	0.82	0.18
White	1.41	0.84	0.16
Black	10.38	0.87	0.13
Hispanic	7.58	0.76	0.24
Asian American	25.26	0.77	0.23
American Indian	7.61	0.72	0.28
Other	36.14	0.44	0.56
GRADE 8			
Total	2.31	0.92	0.08
Male	3.56	0.89	0.11
Female	2.41	0.83	0.17
White	3.36	0.93	0.07
Black	5.95	0.75	0.25
Hispanic	7.69	0.76	0.24
Asian American	27.17	0.73	0.27
American Indian	23.20	0.76	0.24
Other	1034.92	0.98	0.02
GRADE 12			
Total	0.99	0.91	0.09
Male	1.45	0.85	0.15
Female	1.30	0.84	0.16
White	0.96	0.85	0.15
Black	6.01	0.89	0.11
Hispanic	4.11	0.78	0.22
Asian American	30.67	0.91	0.09
American Indian	70.57	0.94	0.06
Other	162.78	0.89	0.11

Table E-5

Estimation Error Variance for the Main Mathematics Algebra and Functions Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
GRADE 4			
Total	0.99	0.83	0.17
Male	1.28	0.78	0.22
Female	1.38	0.76	0.24
White	1.09	0.80	0.20
Black	5.73	0.75	0.25
Hispanic	4.88	0.73	0.27
Asian American	16.94	0.69	0.31
American Indian	6.10	0.71	0.29
Other	49.25	0.72	0.28
GRADE 8			
Total	1.19	0.89	0.11
Male	2.16	0.91	0.09
Female	1.08	0.79	0.21
White	1.61	0.87	0.13
Black	3.90	0.78	0.22
Hispanic	4.33	0.71	0.29
Asian American	18.11	0.80	0.20
American Indian	12.34	0.78	0.22
Other	441.38	0.94	0.06
GRADE 12			
Total	1.33	0.93	0.07
Male	1.70	0.87	0.13
Female	1.64	0.88	0.12
White	1.40	0.92	0.08
Black	8.34	0.89	0.11
Hispanic	4.33	0.76	0.24
Asian American	23.64	0.88	0.12
American Indian	63.71	0.94	0.06
Other	136.92	0.92	0.08

Table E-6

Estimation Error Variance for the Main Mathematics Composite Scale

		Proportion of Variance Due to . . .	
	Total Variance	**Student Sampling**	**Latency of θ**
GRADE 4			
Total	0.78	0.95	0.05
Male	1.06	0.95	0.05
Female	0.96	0.93	0.07
White	0.92	0.95	0.05
Black	5.07	0.94	0.06
Hispanic	4.15	0.93	0.07
Asian American	16.38	0.94	0.06
American Indian	5.14	0.82	0.18
Other	54.25	0.83	0.17
GRADE 8			
Total	1.13	0.96	0.04
Male	1.88	0.96	0.04
Female	1.14	0.94	0.06
White	1.46	0.96	0.04
Black	3.73	0.94	0.06
Hispanic	4.20	0.89	0.11
Asian American	14.81	0.93	0.07
American Indian	8.67	0.85	0.15
Other	421.34	0.95	0.05
GRADE 12			
Total	0.99	0.98	0.02
Male	1.24	0.95	0.05
Female	1.25	0.96	0.04
White	0.97	0.96	0.04
Black	5.14	0.95	0.05
Hispanic	3.35	0.92	0.08
Asian American	23.64	0.96	0.04
American Indian	79.94	0.98	0.02
Other	127.08	0.94	0.06

Table E-7

Estimation Error Variance for the Main Science Earth Science Scale

		Proportion of Variance Due to . . .	
	Total Variance	**Student Sampling**	**Latency of θ**
GRADE 4			
Total	0.72	0.85	0.15
Male	0.98	0.75	0.25
Female	1.08	0.80	0.20
White	1.02	0.85	0.15
Black	5.53	0.83	0.17
Hispanic	3.69	0.77	0.23
Asian American	19.31	0.83	0.17
American Indian	20.13	0.89	0.11
Other	37.63	0.38	0.62
GRADE 8			
Total	0.89	0.91	0.09
Male	1.24	0.86	0.14
Female	1.46	0.89	0.11
White	1.30	0.88	0.12
Black	3.08	0.78	0.22
Hispanic	2.91	0.79	0.21
Asian American	12.67	0.83	0.17
American Indian	19.60	0.91	0.09
Other	28.44	0.53	0.47
GRADE 12			
Total	0.91	0.93	0.07
Male	1.82	0.91	0.09
Female	0.95	0.87	0.13
White	1.04	0.92	0.08
Black	3.69	0.79	0.21
Hispanic	5.87	0.88	0.12
Asian American	9.18	0.84	0.16
American Indian	19.57	0.84	0.16
Other	91.69	0.84	0.16

Table E-8

Estimation Error Variance for the Main Science
Physical Science Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
GRADE 4			
Total	1.16	0.82	0.18
Male	1.62	0.76	0.24
Female	1.40	0.73	0.27
White	1.53	0.79	0.21
Black	4.45	0.72	0.28
Hispanic	4.29	0.69	0.31
Asian American	16.42	0.73	0.27
American Indian	13.11	0.84	0.16
Other	45.78	0.45	0.55
GRADE 8			
Total	0.91	0.92	0.08
Male	1.54	0.88	0.12
Female	1.26	0.87	0.13
White	1.41	0.91	0.09
Black	1.59	0.73	0.27
Hispanic	3.51	0.84	0.16
Asian American	11.13	0.77	0.23
American Indian	24.17	0.92	0.08
Other	40.24	0.58	0.42
GRADE 12			
Total	1.03	0.92	0.08
Male	1.81	0.92	0.08
Female	1.16	0.88	0.12
White	1.34	0.92	0.08
Black	3.60	0.84	0.16
Hispanic	6.16	0.89	0.11
Asian American	9.17	0.86	0.14
American Indian	39.80	0.89	0.11
Other	122.19	0.89	0.11

Table E-9

Estimation Error Variance for the Main Science Life Science Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
GRADE 4			
Total	0.86	0.78	0.22
Male	1.10	0.77	0.23
Female	1.24	0.67	0.33
White	1.06	0.76	0.24
Black	4.07	0.80	0.20
Hispanic	3.53	0.72	0.28
Asian American	17.33	0.74	0.26
American Indian	15.78	0.86	0.14
Other	53.07	0.59	0.41
GRADE 8			
Total	1.07	0.86	0.14
Male	1.40	0.79	0.21
Female	1.77	0.85	0.15
White	1.40	0.86	0.14
Black	2.11	0.68	0.32
Hispanic	4.90	0.82	0.18
Asian American	11.07	0.73	0.27
American Indian	16.00	0.85	0.15
Other	66.28	0.77	0.23
GRADE 12			
Total	0.80	0.89	0.11
Male	1.35	0.87	0.13
Female	1.17	0.85	0.15
White	1.07	0.89	0.11
Black	1.95	0.69	0.31
Hispanic	7.38	0.86	0.14
Asian American	11.73	0.82	0.18
American Indian	27.92	0.86	0.14
Other	59.92	0.76	0.24

Table E-10

Estimation Error Variance for the Main Science Composite Scale

	Total Variance	Proportion of Variance Due to . . . Student Sampling	Latency of θ
GRADE 4			
Total	0.64	0.89	0.11
Male	0.87	0.86	0.14
Female	0.83	0.84	0.16
White	0.81	0.87	0.13
Black	3.74	0.88	0.12
Hispanic	2.80	0.86	0.14
Asian American	13.54	0.91	0.09
American Indian	14.21	0.89	0.11
Other	20.64	0.29	0.71
GRADE 8			
Total	0.78	0.94	0.06
Male	1.12	0.92	0.08
Female	1.27	0.93	0.07
White	1.10	0.93	0.07
Black	1.47	0.84	0.16
Hispanic	3.11	0.91	0.09
Asian American	9.11	0.92	0.08
American Indian	17.45	0.92	0.08
Other	29.61	0.67	0.33
GRADE 12			
Total	0.76	0.96	0.04
Male	1.44	0.95	0.05
Female	0.89	0.94	0.06
White	0.96	0.95	0.05
Black	2.37	0.87	0.13
Hispanic	5.50	0.95	0.05
Asian American	8.39	0.94	0.06
American Indian	23.45	0.89	0.11
Other	82.38	0.87	0.13

Table E-11

Estimation Error Variance for the Reading Long-Term Trend Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
AGE 9			
Total	1.01	0.86	0.14
Male	1.88	0.84	0.16
Female	1.26	0.79	0.21
White	1.37	0.85	0.15
Black	5.21	0.76	0.24
Hispanic	12.36	0.92	0.08
Asian American	22.11	0.87	0.13
American Indian	200.67	0.98	0.02
Other	88.41	0.66	0.34
AGE 13			
Total	0.93	0.85	0.15
Male	1.51	0.82	0.18
Female	1.40	0.78	0.22
White	1.12	0.79	0.21
Black	5.83	0.84	0.16
Hispanic	8.81	0.88	0.12
Asian American	16.83	0.82	0.18
American Indian	69.59	0.95	0.05
Other	197.80	0.69	0.31
AGE 17			
Total	1.08	0.82	0.18
Male	1.92	0.80	0.20
Female	1.34	0.67	0.33
White	1.50	0.80	0.20
Black	5.44	0.72	0.28
Hispanic	13.50	0.85	0.15
Asian American	35.31	0.85	0.15
American Indian	123.66	0.92	0.08
Other	174.14	0.68	0.32

Table E-12

Estimation Error Variance for the Mathematics Long-Term Trend Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
AGE 9			
Total	0.66	0.85	0.15
Male	1.48	0.82	0.18
Female	0.66	0.68	0.32
White	1.12	0.88	0.12
Black	2.35	0.72	0.28
Hispanic	3.13	0.83	0.17
Asian American	20.38	0.82	0.18
American Indian	16.40	0.79	0.21
Other	60.95	0.40	0.60
AGE 13			
Total	0.66	0.89	0.11
Male	0.99	0.86	0.14
Female	0.84	0.86	0.14
White	0.84	0.89	0.11
Black	1.77	0.74	0.26
Hispanic	2.94	0.82	0.18
Asian American	14.03	0.92	0.08
American Indian	73.20	0.96	0.04
Other	81.97	0.57	0.43
AGE 17			
Total	1.24	0.93	0.07
Male	1.68	0.85	0.15
Female	1.79	0.93	0.07
White	1.86	0.93	0.07
Black	3.13	0.83	0.17
Hispanic	4.66	0.78	0.22
Asian American	45.49	0.95	0.05
American Indian	98.09	0.95	0.05
Other	85.23	0.67	0.33

Table E-13

Estimation Error Variance for the Science Long-Term Trend Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
AGE 9			
Total	1.13	0.81	0.19
Male	2.22	0.84	0.16
Female	1.33	0.60	0.40
White	1.60	0.79	0.21
Black	7.21	0.66	0.34
Hispanic	8.58	0.82	0.18
Asian American	34.07	0.83	0.17
American Indian	47.26	0.86	0.14
Other	98.41	0.24	0.76
AGE 13			
Total	1.04	0.87	0.13
Male	1.23	0.75	0.25
Female	1.70	0.82	0.18
White	1.35	0.83	0.17
Black	4.12	0.69	0.31
Hispanic	6.18	0.73	0.27
Asian American	13.17	0.75	0.25
American Indian	47.52	0.93	0.07
Other	67.10	0.56	0.44
AGE 17			
Total	1.40	0.86	0.14
Male	2.92	0.84	0.16
Female	1.84	0.80	0.20
White	1.69	0.85	0.15
Black	6.16	0.74	0.26
Hispanic	11.81	0.83	0.17
Asian American	75.19	0.94	0.06
American Indian	282.35	0.97	0.03
Other	181.29	0.76	0.24

Table E-14

Estimation Error Variance for the Writing Long-Term Trend Scale

		Proportion of Variance Due to . . .	
	Total Variance	Student Sampling	Latency of θ
AGE 9			
Total	0.96	0.87	0.13
Male	1.35	0.83	0.17
Female	1.58	0.92	0.08
White	1.03	0.92	0.08
Black	4.64	0.83	0.17
Hispanic	4.99	0.88	0.12
Asian American	21.40	0.95	0.05
American Indian	23.05	0.94	0.06
Other	141.00	0.88	0.12
AGE 13			
Total	0.97	0.87	0.13
Male	1.36	0.80	0.20
Female	1.11	0.93	0.07
White	0.90	0.88	0.12
Black	5.86	0.88	0.12
Hispanic	3.28	0.88	0.12
Asian American	6.00	0.89	0.11
American Indian	9.95	0.91	0.09
Other	60.30	0.71	0.29
AGE 17			
Total	1.25	0.93	0.07
Male	1.57	0.91	0.09
Female	1.56	0.93	0.07
White	1.50	0.95	0.05
Black	7.78	0.94	0.06
Hispanic	4.37	0.89	0.11
Asian American	9.66	0.91	0.09
American Indian	59.22	0.96	0.04
Other	76.75	0.78	0.22

Appendix F

SETTING THE NAEP ACHIEVEMENT LEVELS FOR THE 1996 MATHEMATICS ASSESSMENT

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National Assessment Governing Board

Introduction

Since 1984, NAEP has reported the performance of students in the nation and for specific subpopulations on a 0-to-500 proficiency scale. The history and development of the scale and the anchoring procedure used to interpret specific points on that scale is described elsewhere in this report.

The achievement levels reported in 1996 were first developed in 1992 through a process described in more detail in the following sections of this chapter. The levels were based on the mathematics assessment framework and item pools developed for the 1990 and 1992 assessments. Although the National Assessment Governing Board (NAGB) updated this framework in preparation for the 1996 assessment, the differences in test and item specifications were not large enough to warrant a new mathematics scale. Therefore, a decision was made by the Board to retain the same levels as reported for the 1990 and 1992 assessments, thus allowing a third point of comparison for the short-term mathematics trend.

History of the Achievement Levels Development 1990 - 1992

The 1988 legislation[1] created an independent board, the National Assessment Governing Board (NAGB), responsible for setting policy for the NAEP program. The Board has a statutory mandate to identify "appropriate achievement goals for each . . . grade in each subject area to be tested under the National Assessment." Consistent with this directive, and striving to achieve one of the primary mandates of the statute "to improve the form and use of NAEP results," the Board set performance standards (called achievement levels by NAGB) for the National Assessment in 1990 and again in 1992. The 1994 legislation (Public Law 103-382) continued the policy Board with slightly increased membership, and a continued mandate to set student performance standards on each age and grade tested.

The 1990 trial, initiated in December 1989 with the dissemination of a draft policy statement (NAGB, 1989) and culminating 22 months later in the publication of the NAGB report, *The Levels of Mathematics Achievement* (Bourque & Garrison, 1991), consisted of two phases: the main study and a replication-validation study. Although there were slight differences between the two phases, there were many common elements. Both phases used a modified (iterative/empirical) Angoff (1971) procedure for arriving at the levels; both focused on estimating performance levels based on a review of the 1990 NAEP mathematics item pool; and both phases employed a set of policy definitions for Basic, Proficient, and Advanced (NAGB, 1990) as the criteria for making the item ratings. However, the 1990 process was evaluated by a number of different groups (see Hambleton & Bourque, 1991) who identified technical flaws in the 1990 process. These evaluations influenced NAGB's decision to set the levels again in 1992 and to not use the 1990 levels as benchmarks for progress toward the national goals during the coming decade. However, it is interesting to note that the 1990 and 1992 processes produced remarkably similar results.

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[1] Public Law 100-297. (1988). National assessment of educational progress improvement act (Article No. USC 1221). Washington, DC.

In September 1991 NAGB contracted with American College Testing (ACT) to convene the panels of judges that would recommend the levels on the 1992 NAEP assessments in reading, writing, and mathematics. While the 1992 level-setting activities were not unlike those undertaken by NAGB in 1990, there were significant improvements made in the process for 1992. There was a concerted effort to bring greater technical expertise to the process: The contractor selected by NAGB has a national reputation for setting standards in a large number of certification and licensure exams; an internal and external advisory team monitored all the technical decisions made by the contractor throughout the process; and state assessment directors periodically provided their expertise and technical assistance at key stages in the project.

Setting achievement levels is a method for setting standards on the NAEP assessment that identifies what students should know and be able to do at various points along the proficiency scale. The initial policy definitions of the achievement levels were presented to panelists along with an illustrative framework for more indepth development and operationalization of the levels. Panelists were asked to determine descriptions/definitions of the three levels from the specific framework developed for the NAEP assessment with respect to the content and skills to be assessed. The operationalized definitions were refined throughout the level-setting process, as well as validated with a supplementary group of judges subsequent to the level-setting meetings. Panelists were also asked to develop a list of illustrative tasks associated with each of the levels, after which sample items from the NAEP item pool were identified to exemplify the full range of performance of the intervals between levels. The emphasis in operationalizing the definitions and in identifying and selecting exemplar items and papers was to represent the full range of performance from the lower level to the next higher level. The details of the implementation procedures are outlined in the remainder of this appendix.

Preparing for the 1992 Mathematics Level-Setting Meeting

It is important for the planning of any standard-setting effort to know how various process elements interact with each other. For example, panelists interact with pre-meeting materials, the meeting materials (i.e., the assessment questions, rating forms, rater feedback, and so forth), each other, and the project staff. All of these elements combine to promote or degrade what has been called intrajudge consistency and interjudge consensus (Friedman & Ho, 1990).

Previous research has conceptualized the effects of two major kinds of interaction: people interacting with text (Smith & Smith, 1988) and people interacting with each other (Curry, 1987; Fitzpatrick, 1989). To assess the effects of textual and social interaction and adjust the standard setting procedures accordingly, a pilot study was conducted as the first phase of the 1992 initiative.

Reading was chosen as the single content area to be pilot-tested since it combined all of the various features found in the other NAEP assessments, including multiple-choice, short constructed-response, and extended constructed-response items. The pilot study provided the opportunity to implement and evaluate all aspects of the operational plan—background materials, meeting materials, study design, meeting logistics, staff function, and participant function.

The overall pilot effort was quite successful. The level-setting process worked well, and the pilot allowed the contractor to make improvements in the design before implementation activities began. For example, schedule changes were made that allowed the panelists more time to operationalize the policy definitions before beginning the item-rating task. Also, the feedback mechanisms used to inform panelists about interjudge and intrajudge consistency data were improved for clarity and utility to the entire process.

The Mathematics Level-Setting Panel

Sixty-nine panelists representing 32 jurisdictions (31 states and the District of Columbia) from the 424 nominees were invited to participate in the level-setting process. They represented mathematics teachers at grades 4, 8, and 12, nonteacher educators, and members of the noneducator (general public) community. The group was balanced by gender, race/ethnicity, NAEP regions of the country, community type (low SES, not low SES), district size, and school type (public/private). One panelist was unable to attend due to a family emergency, resulting in 68 participants: 24 at grade 4 and 22 at grades 8 and 12.

Process for Developing the Achievement Levels

The four-and-one-half day session began with a brief overview of NAEP and NAGB, a presentation on the policy definitions of the achievement levels, a review of the NAEP mathematics assessment framework, and a discussion of factors that influence item difficulty. The purpose of the presentation was to focus panelists' attention on the mathematics framework and to emphasize the fact that panelists' work was directly related to the NAEP assessment, not to the whole domain of mathematics.

All panelists completed and self-scored an appropriate grade-level form of the NAEP assessment. The purpose of this exercise was to familiarize panelists with the test content and scoring protocols before beginning to develop the preliminary operationalized descriptions of the three levels.

Working in small groups of five or six, panelists expanded and operationalized the policy definitions of Basic, Proficient, and Advanced in terms of specific mathematical skills, knowledge, and behaviors that were judged to be appropriate expectations for students in each grade, and were in accordance with the current mathematics assessment framework.

The policy definitions are as follows:

Basic	This level, below proficient, denotes partial mastery of the knowledge and skills that are fundamental for proficient work at each grade—4, 8, and 12.
Proficient	This central level represents solid academic performance for each grade tested—4, 8, and 12. Students reaching this level have demonstrated competency over challenging subject matter and are well prepared for the next level of schooling.
Advanced	This higher level signifies superior performance beyond proficient grade-level mastery at grades 4, 8, and 12.

The small groups were allowed to brainstorm about what student performance *should* be, using the framework and their experience in completing the NAEP assessment as guides[2]. A comprehensive listing of grade-level descriptors was developed, and panelists were asked to identify the five that best described what students *should* be able to do at each of the levels. Those descriptors appearing with the greatest frequency were compiled into a discussion list for the grade-level groups. Additions, deletions, and modifications were made as a result of discussions, and the groups reached general agreement that the final list of descriptors represented what students *should* be able to do at each achievement level.

Panelists next received two hours of training in the Angoff method. Training was customized to reflect the unique item formats of the particular subject area assessment. Once a conceptual consensus was reached about the characteristics of *marginally* acceptable examinees at each of the three levels, practice items from the released pool were rated by the panelists according to the process defined in the contractor's plan. For multiple-choice and short constructed-response items, panelists were asked to rate each item for the expected probability of a correct response for a group of *marginally* acceptable examinees at the Basic, Proficient, and Advanced levels. For extended constructed-response items, panelists were asked to review 20 to 25 student response papers and select three papers, one for each achievement level, that typified *marginally* acceptable examinee performance for that level.

Following training in the Angoff method, the judges began the rating process, inspecting and rating each item in the pool for the expected probabilities of answering the item correctly at each level. Panelists completed three rounds of item ratings. For Round 1, panelists first answered the items in each section, then reviewed their answers using scoring keys and protocols. This process helped ensure that panelists would be thoroughly familiar with each item, including the foils and scoring rubrics, before rating the items. Panelists provided item ratings/paper selections for all three achievement levels, one item at a time, for all the items in a section, then proceeded to the next set of items, for which the process was repeated. During Round 1, panelists used their lists of descriptors and other training materials for guidance in the rating process.

Following Round 1, item response theory (IRT) was used to convert the rating results[3] for each rater to a latent ability scale represented by the Greek letter theta (θ). This θ scale was the same scale used to calibrate the NAEP items evaluated by each panelist. In order to provide meaningful feedback about item ratings, a special *relative scale* was constructed, which was a linear transformation of the theta scale having a mean of 75 and standard deviation of 15. Before Round 2 of the rating process, panelists were given interjudge consistency information using this relative scale. This information allowed panelists to see on the scale where their individual mean item ratings were, relative to the mean for the group and to the means for other panelists. Reasons for extreme mean ratings, including the possibility that some panelists misinterpreted the item rating task, were discussed briefly.

Before Round 2, panelists were also given item difficulty data. This information was presented as the percentage of students who answered each item correctly during the actual NAEP administration, for items scored "correct" or "incorrect" (i.e., multiple-choice and short constructed-response items), and as the percentage of students receiving scores of 1, 2, 3, and 4 for the extended constructed-response items[4]. Panelists were told that this item difficulty information should be used as a reality check. For items on which item ratings differed substantially from the item difficulty value, panelists were asked to reexamine the item to determine if they had misinterpreted the item or misjudged its difficulty. Results of the data analysis, and panelists' own evaluations, indicated that the item difficulty information was perceived as very useful but had little impact on panelists' ratings.

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[2] The panelists also reviewed about half the item pool (the half they would not be rating later) so the descriptors could be further modified if appropriate.

[3] Because the IRT item parameters were not available for the polytomously scored (extended constructed-response) items, these items (five at grade 4, six each at grades 8 and 12) were not included in the following discussion of results.

[4] The percentages presented to the raters summed to 100 percent, but this excluded the percentages—around 80 percent, in some cases—of students who wrote responses that were judged to be "off-task," those who "skipped" that question and continued beyond that question, and those who, apparently, "never reached" that question.

For Round 2, panelists reviewed the same set of items they had rated in Round 1 and, using the interjudge consistency information, the item difficulty information, and the information provided prior to Round 1, they either confirmed their initial item ratings or adjusted their ratings to reflect the additional information. About one-third of Round 1 item ratings were adjusted during Round 2.

Following Round 2, panelists' ratings were reanalyzed and additional information was presented to panelists concerning intrajudge variability prior to Round 3. For each panelist, the intrajudge variability information consisted of those items that they had rated differently than items having similar difficulty, taking into consideration the panelist's aggregated item ratings. That is, the panelists' aggregated item ratings were converted to the theta (θ) scale. All items rated by the panelists were then analyzed in terms of the panelist's achievement level (θ) in comparison to actual student performance on the items. The observed item rating from each panelist was contrasted to an expected item rating. Those items with large differences between observed and expected ratings were identified. Panelists were given this information and asked to review each of these items and decide if their Round 2 ratings still accurately reflected their best judgments of the items. The intrajudge consistency data was to be used to flag items for reconsideration in the final round of rating.

For Round 3, panelists reviewed the same set of items they rated in Rounds 1 and 2 using both the new intrajudge variability information and the information made available during Rounds 1 and 2. In addition, panelists could discuss, within their small groups, ratings of specific items about which they were unsure. About 20 percent of the item ratings were adjusted during Round 3.

Process of Selecting Exemplar Items

Following the standard-setting meeting, a series of procedures was implemented to select exemplar items. First, expected and empirical p-values were computed for each item in the released item pool. Expected p-values were based on predicted performance at the cut-off score for each achievement level and empirical p-values were based on the average performance of all students responding to the item. Items that did not have expected p-values ≥ 0.51 for any of the levels were deleted from the item pool. Second, items were compared to the operationalized descriptions of the levels. Items that did not match the content of the descriptions were deleted from the item pool. Third, the remaining items were classified as possible Basic, Proficient, or Advanced exemplars based on content match. Fourth, the validation panel reviewed the items and recommended a set of items to serve as exemplars for the levels. The final set of items was reviewed and approved by NAGB at their May 1992 meeting. These procedures are described in detail below.

Using the standard-setting ratings, expected p-values were computed for each item at the cut point for each achievement level. The criteria described below were applied to the scale-level results and an analysis was conducted to delineate items that could serve as exemplars for each achievement level (Basic, Proficient, Advanced).

More specifically, for an item to be chosen as a possible exemplar for the Basic achievement level:

1. The expected p-value for students at the cut point for the Basic level of achievement had to be greater than 0.51;
2. The content of the item had to match the content of the operationalized description of Basic; and
3. The empirical p-value for the item had to be higher than empirical p-values for items selected as exemplars for the Proficient level.

As an example:

Grade 4 Basic Level Item M022801

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.70	0.82	0.94
Empirical p-value = 0.52			

For an item to be chosen as a possible exemplar for the Proficient achievement level:

1. The expected p-value for students at the cut-off score for the Proficient level of achievement had to be greater than 0.51;
2. The content of the item had to match the content of the operationalized description of Proficient; and
3. The empirical p-value for the item had to be lower than empirical p-values for Basic exemplar items, but higher than student p-values for Advanced exemplar items.

As an example:

Grade 4 Proficient Level Item M022001

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.37	0.58	0.76
Empirical p-value = 0.35			

For an item to be chosen as a possible exemplar for the Advanced achievement level:

1. The expected p-value for students at the cut-point for the Advanced level of achievement had to be greater than 0.51;
2. The content of the item had to match the content of the operationalized description of Advanced; and
3. The empirical p-value for the item had to be lower than empirical p-values for Proficient exemplar items.

As an example:

Grade 4 Advanced Level Item M023101

Level	Basic	Proficient	Advanced
Scale point	211	248	280
Expected p-value	0.29	0.43	0.61
Empirical p-value = 0.22			

The analysis procedures described above yielded 31 items as possible grade 4 exemplars, 43 items as possible grade 8 exemplars, and 37 items as possible grade 12 exemplars, as follows:

Possible Exemplar Items by Grade and Achievement Level

Grade	Basic	Proficient	Advanced
4	9	14	8
8	23	15	5
12	14	16	7

For grade 4, the possible exemplars represented 49 percent of the released item pool. For grades 8 and 12, the possible exemplars represented 54 percent of the released item pool for each grade.

Process for Validating the Levels

Eighteen mathematics educators participated in the item selection and content validation process. Ten of the panelists were mathematics teachers who had participated in the original achievement levels-setting process and who had been identified as outstanding panelists by grade group facilitators during this meeting. The other eight panelists represented the National Council of Teachers of Mathematics, the

Mathematical Sciences Education Board, and state-level mathematics curriculum supervisors. To the extent possible, the group was balanced by race/ethnicity, gender, community type, and region of the country.

The two-and-one-half day meeting began by briefing panelists on the purpose of the meeting. They first reviewed the operationalized descriptions of the achievement levels for consistency with the NAGB policy definitions of Basic, Proficient, and Advanced and with the NAEP *Mathematics Objectives.* Next, they reviewed the operationalized descriptions of the achievement levels for qualities such as within- and across-grade consistency, grade-level appropriateness, and utility for increasing the public's understanding of the NAEP mathematics results. Finally, working first in grade level (4, 8, and 12) groups of six panelists each, then as a whole group, panelists revised the operationalized descriptions to provide more within- and across-grade consistency and to align the language of the description more closely with the language of the NCTM *Standards*. Both the original descriptions and the revised descriptions are included later in this appendix.

On the third day, panelists again split into grade-level groups of six panelists each and reviewed the possible exemplar items. The task was to select a set of items, for each achievement level for their grade, that would best communicate to the public the levels of mathematics ability and the types of skills needed to perform in mathematics at that level.

After selecting sets of items for their grades, the three grade-level groups met as a whole group to review item selection. During this process, cross-grade items that had been selected as exemplars by two grade groups (three such items were selected by grade groups 4 and 8) were assigned to one grade by whole-group consensus. In addition, items were evaluated by the whole group for overall quality. Two items were rejected by the group during this process due to possible bias. This process yielded 14 items as recommended exemplars for grade 4, 11 items as recommended exemplars for grade 8, and 14 items as recommended exemplars for grade 12.

Mapping Panelists' Ratings to the NAEP Scales

The process of mapping panelists' ratings to the NAEP scales made significant use of *item response theory* (IRT). IRT provides statistically sophisticated methods for determining the expected performance of examinees on particular test items in terms of an appropriate measurement scale. The same measurement scale simultaneously describes the characteristics of the test items and the performance of the examinees. Once the item characteristics are set, it is possible to precisely determine how examinees are likely to perform on the test items at different points of the measurement scale.

The panelists' ratings of the NAEP test items were likewise linked, by definition, to the expected performance of examinees at the theoretical achievement level cut points. It was therefore feasible to use the IRT item characteristics to calculate the values on the measurement scale corresponding to each achievement level. This was done by averaging the item ratings over panelists for each achievement level and then simply using the item characteristics to find the corresponding achievement level cut points on the IRT measurement scale. This process was repeated for each of the NAEP content strands within each grade (4, 8, and 12).

In the final stage in the mapping process, the achievement level cut points on the IRT measurement scale were combined over content strands and rescaled to the NAEP score scale. Weighted averages of the achievement level cut points were computed. The weighting constants accounted for the measurement precision of the test items evaluated by the panelists, the proportion of items belonging to each NAEP content strand, and the linear NAEP scale transformation. These weighted averages produced the final cut points for the Basic, Proficient, and Advanced achievement levels within each grade.

Evaluation of the Mathematics Levels

The 1992 mathematics achievement levels used here to report the 1996 NAEP data were evaluated under a Congressional mandate by the National Academy of Education (NAE). A series of research studies were mounted by the NAE (National Academy of Education, 1993) to look at various aspects of the validity of the level-setting process, and the levels adopted by NAGB. Several of these studies focused specifically on the mathematics achievement levels, and were conducted for the Academy by staff at the Learning Research and Development Center at the University of Pittsburgh. Based on these studies, the Academy's 1993 policy report concluded that the achievement levels in mathematics were flawed and should not be continued. The more recent report from the Academy (National Academy of Education, 1997) concluded that the current achievement levels raised serious concerns about their reliability and validity, were not reasonable (i.e., were set too high), and in the final analysis, should be abandoned by the end of the century.

While NAGB did not agree with the earlier policy report and continues to disagree with the more recent one, and while the Board's contractor and its technical advisors do not believe the weight of the evidence supported the NAEP conclusions, the Board believes that standards-based reporting is responsive to the needs of the users of NAEP data, is an important aspect of the national reform movement, and assists in making NAEP data more useful and understandable to the public. The Board is committed to making improvements in the process, and will continue to support further investigation into the validity of the levels through additional research.

Figure F-1

Final Description of 1992 Mathematics Achievement Levels

GRADE 4

The NAEP content strands include: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. (Note: At the fourth-grade level, algebra and functions are treated in informal and exploratory ways, often through the study of patterns.) Skills are cumulative across levels—from Basic to Proficient to Advanced.

BASIC. Fourth-grade students performing at the **basic level** *should show some evidence of understanding the mathematical concepts and procedures in the five NAEP content strands.*

Specifically, fourth graders performing at the basic level should be able to estimate and use basic facts to perform simple computations with whole numbers; show some understanding of fractions and decimals; and solve simple real-world problems in all NAEP content strands. Students at this level should be able to use—though not always accurately—four-function calculators, rulers, and geometric shapes. Their written responses are often minimal and presented without supporting information.

(continued)

Figure F-1 (continued)

Final Description of 1992 Mathematics Achievement Levels

PROFICIENT. Fourth-grade students performing at the **proficient level** *should consistently apply integrated procedural knowledge and conceptual understanding to problem solving in the five NAEP content strands.*

Specifically, fourth graders performing at the proficient level should be able to use whole numbers to estimate, compute, and determine whether results are reasonable. They should have a conceptual understanding of fractions and decimals; be able to solve real-world problems in all NAEP content strands; and use four-function calculators, rulers, and geometric shapes appropriately. Students performing at the proficient level should employ problem-solving strategies such as identifying and using appropriate information. Their written solutions should be organized and presented both with supporting information and explanations of how they were achieved.

ADVANCED. Fourth-grade students performing at the **advanced level** *should apply integrated procedural knowledge and conceptual understanding to complex and nonroutine real-world problem solving in the five NAEP content strands.*

Specifically, fourth graders performing at the advanced level should be able to solve complex and nonroutine real-world problems in all NAEP content strands. They should display mastery in the use of four-function calculators, rulers, and geometric shapes. These students are expected to draw logical conclusions and justify answers and solution processes by explaining why, as well as how, they were achieved. They should go beyond the obvious in their interpretations and be able to communicate their thoughts clearly and concisely.

GRADE 8

NAEP content strands: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. Skills are cumulative across all levels—from Basic to Proficient to Advanced.

BASIC. Eighth-grade students performing at the **basic level** *should exhibit evidence of conceptual and procedural understanding in the five NAEP content strands.* This level of performance signifies an understanding of arithmetic operations—including estimation—on whole numbers, decimals, fractions, and percents.

Eighth graders performing at the basic level should complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. They should be able to solve problems in all NAEP content strands through the appropriate selection and use of strategies and technological tools—including calculators, computers, and geometric shapes. Students at this level also should be able to use fundamental algebraic and informal geometric concepts in problem solving.

As they approach the proficient level, students at the basic level should be able to determine which of available data are necessary and sufficient for correct solutions and use them in problem solving. However, these eighth graders show limited skill in communicating mathematically.

(continued)

Figure F-1 (continued)

Final Description of 1992 Mathematics Achievement Levels

PROFICIENT. Eighth-grade students performing at the **proficient level** *should apply mathematical concepts and procedures consistently to complex problems in the five NAEP content strands.*

They should be able to conjecture, defend their ideas, and give supporting examples. They should understand the connections between fractions, percents, decimals, and other mathematical topics such as algebra and functions. Students at this level are expected to have a thorough understanding of basic-level arithmetic operations—an understanding sufficient for problem solving in practical situations.

Quantity and spatial relationships in problem solving and reasoning should be familiar to them, and they should be able to convey underlying reasoning skills beyond the level of arithmetic. They should be able to compare and contrast mathematical ideas and generate their own examples. These students should make inferences from data and graphs; apply properties of informal geometry; and accurately use the tools of technology. Students at this level should understand the process of gathering and organizing data and be able to calculate, evaluate, and communicate results within the domain of statistics and probability.

ADVANCED. Eighth-grade students at the **advanced level** *should be able to reach beyond the recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles in the five NAEP content strands.*

They should be able to probe examples and counter examples in order to shape generalizations from which they can develop models. Eighth graders performing at the advanced level should use number sense and geometric awareness to consider the reasonableness of an answer. They are expected to use abstract thinking to create unique problem-solving techniques and explain the reasoning processes underlying their conclusions.

GRADE 12

NAEP content strands: (1) number sense, properties, and operations; (2) measurement; (3) geometry; (4) data analysis, statistics, and probability; (5) algebra and functions. Skills are cumulative across levels—from Basic to Proficient to Advanced.

BASIC. Twelfth-grade students at the **basic level** *should demonstrate procedural and conceptual knowledge in solving problems in the five NAEP content strands.*

They should be able to use estimation to verify solutions and determine the reasonableness of results as applied to real-world problems. They are expected to use algebraic and geometric reasoning strategies to solve problems. Twelfth graders performing at the basic level should recognize relationships presented in verbal, algebraic, tabular, and graphical forms; and demonstrate knowledge of geometric relationships and corresponding measurement skills.

Twelfth graders at the basic level should be able to apply statistical reasoning in the organization and display of data and in reading tables and graphs. They also should be able to generalize from patterns and examples in the areas of algebra, geometry, and statistics. At this level, they should use correct mathematical language and symbols to communicate mathematical relationships and reasoning processes; and use calculators appropriately to solve problems.

Figure F-1 (continued)

Final Description of 1992 Mathematics Achievement Levels

PROFICIENT. Twelfth-grade students at the **proficient level** *should consistently integrate mathematical concepts and procedures to the solutions of more complex problems in the five NAEP content strands.*

Twelfth graders performing at the proficient level should demonstrate an understanding of algebraic, statistical, and geometric and spatial reasoning. They should be able to perform algebraic operations involving polynomials; justify geometric relationships; and judge and defend the reasonableness of answers as applied to real-world situations. These students should be able to analyze and interpret data in tabular and graphical form; understand and use elements of the function concept in symbolic, graphical, and tabular form; and make conjectures, defend ideas, and give supporting examples.

ADVANCED. Twelfth-grade students at the **advanced level** *should consistently demonstrate the integration of procedural and conceptual knowledge and the synthesis of ideas in the five NAEP content strands.*

They should understand the function concept; and be able to compare and apply the numeric, algebraic, and graphical properties of functions. They should apply their knowledge of algebra, geometry, and statistics to solve problems in more advanced areas of continuous and discrete mathematics.

Twelfth graders performing at the advanced level should be able to formulate generalizations and create models through probing examples and counterexamples. They are expected to communicate their mathematical reasoning through the clear, concise, and correct use of mathematical symbolism and logical thinking.

Figure F-2

Draft Descriptions of the Achievement Levels
Prepared by the Original Level-Setting Panel

Fourth-Grade Draft Descriptions

BASIC. The Basic level signifies some evidence of conceptual and procedural understanding in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. Understanding simple facts and single-step operations are included at this level, as is the ability to perform simple computations with whole numbers. This level shows a partial mastery of estimation, basic fractions, and decimals relating to money or the number line; it shows an ability to solve simple real-world problems involving measurement, probability, statistics, and geometry. At this level, there is a partial mastery of tools such as four-function calculators and manipulatives (geometric shapes and rulers). Written responses are often minimal, perhaps with a partial response and lack of supportive information.

(continued)

Figure F-2 (continued)

Draft Descriptions of the Achievement Levels
Prepared by the Original Level-setting Panel

PROFICIENT. The Proficient level signifies consistent demonstration of the integration of procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. The Proficient level indicates an ability to perform computation and estimation with whole numbers, to identify fractions, and to work with decimals involving money or the number line. Solving real-world problems involving measurement, probability, statistics, and geometry is an important part of this level. This level signifies the ability to use, as tools, four-function calculators, rulers, and manipulatives (geometric shapes). It includes the ability to identify and use pertinent/appropriate information in problem settings. The ability to make connections between and among skills and concepts emerges at this level. Clear and organized written presentations, with supportive information, are typical. And, there is an ability to explain how the solution was achieved.

ADVANCED. The Advanced level signifies the integration of procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands of *number sense, properties, and operations; measurement; geometry and spatial sense; data analysis, statistics, and probability; and algebra and functions*. This is evidenced by divergent and elaborate written responses. The Advanced level indicates an ability to solve multistep and nonroutine real-world problems involving measurement, probability, statistics, and geometry, and an ability to perform complex tasks involving multiple steps and variables. Tools are mastered, including four-function calculators, rulers, and manipulatives (geometric shapes). This level signifies the ability to apply facts and procedures by explaining *why* as well as *how*. Interpretations extend beyond obvious connections and thoughts are communicated clearly and concisely. At this level, logical conclusions can be drawn and complete justifications can be provided for answers and/or solution processes.

Eighth-Grade Draft Descriptions

BASIC. Basic students should begin to describe objects, to process accurately and elaborate relationships, to compare and contrast, to find patterns, to reason from graphs, and to understand spatial reasoning. This level of partial mastery signifies an understanding of arithmetic operations on whole numbers, decimals, fractions, and percents, including estimation. Problems that are already set up are generally solved correctly, as are one-step problems. However, problems involving the use of available data, and determinations of what is necessary and sufficient to solve the problem, are generally quite difficult. Students should select appropriate problem-solving tools, including calculators, computers, and manipulatives (geometric shapes) to solve problems from the five content strands. Students should also be able to use elementary algebraic concepts and elementary geometric concepts to solve problems. This level indicates familiarity with the general characteristics of measurement. Students at this level may demonstrate limited ability to communicate mathematical ideas.

(continued)

Figure F-2 (continued)
Draft Descriptions of the Achievement Levels
Prepared by the Original Level-setting Panel

PROFICIENT. Proficient students apply mathematical concepts consistently to more complex problems. They should make conjectures, defend their ideas, and give supporting examples. They have developed the ability to relate the connections between fractions, percents, and decimals, as well as other mathematical topics. The Proficient level denotes a thorough understanding of the arithmetic operations listed at the Basic level. This understanding is sufficient to permit applications to problem solving in practical situations. Quantity and spatial relationships are familiar situations for problem solving and reasoning, and this level signifies an ability to convey the underlying reasoning skills beyond the level of arithmetic. Ability to compare and contrast mathematical ideas and generating examples is within the Proficient domain. Proficient students can make inferences from data and graphs; they understand the process of gathering and organizing data, calculating and evaluating within the domain of statistics and probability, and communicating the results. The Proficient level includes the ability to apply the properties of elementary geometry. Students at this level should accurately use the appropriate tools of technology.

ADVANCED. The Advanced level is characterized by the ability to go beyond recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles. Generalization often takes shape through probing examples and counterexamples and can be focused toward creating models. Mathematical concepts and relationships are frequently communicated with mathematical language, using symbolic representations where appropriate. Students at the Advanced level consider the reasonableness of an answer, with both number sense and geometric awareness. Their abstract thinking ability allows them to create unique problem-solving techniques and explain the reasoning processes they followed in reaching a conclusion. These students can probe through examples and counterexamples that allow generalization and description of assumptions with models and elegant mathematical language.

Twelfth-Grade Draft Descriptions

BASIC. This level represents understanding of fundamental algebraic operations with real numbers, including the ability to solve two-step computational problems. It also signifies an understanding of elementary geometrical concepts such as area, perimeter, and volume, and the ability to make measurements of length, weight, capacity, and time. Also included at the Basic level is the ability to comprehend data in both tabular and graphical form and to translate between verbal, algebraic, and graphical forms of linear expression. Students at this level should be able to use a calculator appropriately.

PROFICIENT. This level represents mastery of fundamental algebraic operations and concepts with real numbers, and an understanding of complex numbers. It also represents understanding of polynomials and their graphs up to the second degree, including conic sections. The elements of plane, solid, and coordinate geometry should be understood at the Proficient level. The Proficient level includes the ability to apply concepts and formulas to problem solving. Students at this level should demonstrate critical thinking skills. The Proficient level also represents the ability to judge the reasonableness of answers and the ability to analyze and interpret data in both tabular and graphical form. Basic algebraic concepts, measurement, and constructive geometry concepts are mastered at this level.

ADVANCED. The Advanced level represents mastery of trigonometric, exponential, logarithmic, and composite functions, zeros and inverses of functions, polynomials of the third degree and higher, rational functions, and graphs of all of these. In addition, the Advanced level represents mastery of topics in discrete mathematics including matrices and determinants, sequences and series, and probability and statistics, as well as topics in analytic geometry. The Advanced level also signifies the ability to successfully apply these concepts to a variety of problem-solving situations.

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Figure F-3

Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

Revised Fourth-Grade Draft Descriptions

BASIC. Basic students exhibit some evidence of conceptual and procedure understanding in the five NAEP content strands. At the fourth grade level, algebra and functions are treated in informal and exploratory ways often through the study of patterns. Basic students estimate and use basic facts to perform simple computations with whole numbers. These students show some understanding of fractions and decimals. They solve simple real world problems in all areas. These students use, although not always accurately, four-function calculators, rulers, and geometric shapes. Written responses are often minimal and lack supporting information.

PROFICIENT. Proficient students consistently integrate procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands. Using whole numbers they estimate, compute, and determine whether their results are reasonable. They have a conceptual understanding of fractions and decimals. Solving real world problems in all areas is important at this level. Proficient students appropriately use four-function calculators, rulers and geometric shapes. These students use problem solving strategies such as identifying and using appropriate information. [Problem-solving strategies include identification and use of appropriate information.] They present organized written solutions with supporting information and explain how they were achieved.

ADVANCED. Advanced students integrate procedural knowledge and conceptual understanding as applied to problem solving in the five NAEP content strands. They solve complex and nonroutine real-world problems in all areas. They have mastered the use of tools such as four-function calculators, rulers and geometric shapes. Advanced students draw logical conclusions and justify answers and solution processes by explaining the "why" as well as the "how." Interpretations extend beyond obvious connections and thoughts are communicated clearly and concisely.

Revised Eighth-Grade Draft Descriptions

BASIC. Basic students exhibit evidence of conceptual and procedural understanding. These students compare and contrast, find patterns, reason from graphs, and understand spatial reasoning. This level of performance signifies an understanding of arithmetic operations, including estimation, on whole numbers, decimals, fractions, and percents. Students complete problems correctly with the help of structural prompts such as diagrams, charts, and graphs. As students approach the proficient level, they will solve problems involving the use of available data, and determine what is necessary and sufficient for a correct solution. Students use problem solving strategies and select appropriate tools, including calculators, computers, and manipulatives (geometric shapes) to solve problems from the five content strands. Students use fundamental algebraic and informal geometric concepts to solve problems. Students at this level demonstrate limited skills in communicating mathematically.

(continued)

Figure F-3 (continued)

Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

PROFICIENT. Proficient students apply mathematical concepts and procedures consistently to complex problems. They make conjectures, defend their ideas, and give supporting examples. They have developed the ability to relate the connections between fractions, percents, and decimals, as well as other mathematical topics, such as algebra and functions. The proficient level denotes a thorough understanding of the arithmetic operations listed at the basic level. This understanding is sufficient to permit applications to problem solving in practical situations. Quantity and spatial relationships are familiar situations for problem solving and reasoning, and students at this level convey the underlying reasoning skills beyond the level of arithmetic. Proficient students compare and contrast mathematical ideas and generate their own examples. These students make inferences from data and graphs; they understand the process of gathering and organizing data, calculating, evaluating, and communicating the results within the domain of statistics and probability. Proficient students apply the properties of informal geometry, and accurately use the appropriate tools of technology.

ADVANCED. Advanced students go beyond recognition, identification, and application of mathematical rules in order to generalize and synthesize concepts and principles. Generalization often takes shape through probing examples and counter examples and can be used to create models. Mathematical concepts and relationships are frequently communicated with mathematical language, using symbolic representations where appropriate. Students at the advanced level consider the reasonableness of an answer, with both number sense and geometric awareness. Their abstract thinking allows them to create unique problem solving techniques and explain the reasoning processes they followed in reaching a conclusion. These students probe examples and counter examples that allow generalization and description of assumptions with models and elegant mathematical language.

Revised Twelfth-Grade Draft Descriptions

BASIC. Basic students demonstrate procedural and conceptual knowledge in solving problems in the five NAEP content strands. They use estimation to verify solutions and determine the reasonableness of the results to real world problems. Algebraic and geometric reasoning strategies are used to solve problems. These students recognize relationships in verbal, algebraic, tabular, and graphical forms. Basic students demonstrate knowledge of geometric relationships as well as corresponding measurement skills. Statistical reasoning is applied to the organization and display of data and to reading tables and graphs. These students generalize from patterns and examples in the areas of algebra, geometry, and statistics. They communicate mathematical relationships and reasoning processes with correct mathematical language and symbolic representations. Calculators are used appropriately to solve problems.

PROFICIENT. Proficient students integrate mathematical concepts and procedures consistently to more complex problems in the five NAEP content strands. They demonstrate an understanding of algebraic reasoning, geometric and spatial reasoning, and statistical reasoning as applied to other areas of mathematics. They perform algebraic operations involving polynomials, justify geometric relationships, and judge and defend the reasonableness of answers in real world situations. These students analyze and interpret data in tabular and graphical form. Proficient students understand and use elements of the function concept in symbolic, graphical and tabular form. They make conjectures, defend their ideas, and give supporting examples.

(continued)

Figure F-3 (continued)

Revised Draft Descriptions of the Achievement Levels
Recommended by the Follow-Up Validation Panel

ADVANCED. Advanced students consistently demonstrate the integration of procedural and conceptual knowledge, as well as the synthesis of ideas, in the five NAEP content strands. Advanced students understand the function concept, and they compare and apply the numeric. algebraic, and graphical properties of functions. They apply and connect their knowledge of algebra, geometry, and statistics to solve problems in more advanced areas of continuous and discrete mathematics. Advanced students formulate generalizations using examples and counter examples to create models. In communicating their mathematical reasoning, these students demonstrate clear, concise, and correct use of mathematical symbolism and logical thinking.

Figure F-4

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Marge Blizard
Blizard Professional Cleaning
Franklin, Connecticut

Christopher Chomyak
The Episcopal Church
Calais, Maine

Janet Green
Met Life
Crownsville, Maryland

Mary Norman
Dekalb County Board of
Education
Decatur, Georgia

Janice Wamsley
Alcorn School System
Glen, Mississippi

Ronald Higgins
Walla Walla School District
Walla Walla, Washington

Leona Lee
Baltimore City Public Schools
Baltimore, Maryland

Lisa Bietau
USD383 Manhat. Pub Schools
Manhattan, Kansas

Marsha Davis
Alcorn County Schools
Corinth, Mississippi

Jean Bush Ragin
Patterson High School
Baltimore, Maryland

Bill Oldham
Harding University
Searcy, Arkansas

George Shell
Retired Principal
Draper, Utah

Marsha Stovey
Detroit Public Schools
Detroit, Michigan

Vance Morris
Dekalb County Board of
Education
Atlanta, Georgia

Carol Ballentine
Duval County Schools
Jacksonville, Florida

Tami Harvey, ESD
Audiometric Technician
Burns, Oregon

Laurence Payne
Greater Houston Coalition
for Educational Excellence
Houston, Texas

Cheryl Yunk
USD 383
Manhattan, Kansas

Kirby Gchachu
Zuni Public School District
Zuni, New Mexico

Corliss Hubert
Rutherford Board of Education
Englewood, New Jersey

Joyce Dunn
Alcorn County Schools
Corinth, Mississippi

(continued)

Figure F-4 (continued)

Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Gloria Moran
Williams Junior High
Bridgewater, Massachusetts

Charles Jackson
Blairsville, Pennsylvania

Cassandra Turner
Internal Revenue Service
Miami, Florida

Jack Deal
Bethel Park School District
Pittsburgh, Pennsylvania

Ninfa Rivera
Lyford CISD
Raymondville, Texas

Gerald Zeringue
Garrity Construction Company
Harvey, Louisiana

Linda Brown
Van Zile Elementary School
Detroit, Michigan

Judy Bibb
Lonoke High School
Cabot, Arkansas

David Rank
School District of Greenville
Greenville, South Carolina

John Sweeney
Freed-Haideman University
Henderson, Tennessee

Nancy Pejouhy
Woodstock Union High School
Woodstock, Vermont

Jim Trefzger
Parkland College
Champaign, Illinois

Joanne Greaver
Jefferson Coun. Public Schools
Louisville, Kentucky

Ellie Cucinatto
Bridgewater Public Schools
Bridgewater, Massachusetts

Lillie Carr
Pender County Schools
Teachey, North Carolina

Eric Cain
IBM
Metairie, Louisiana

Phillip Stroup
Butler County MR/DD
Seven Mile, Ohio

Mike Gobel
Walla Walla School District
Walla Walla, Washington

Juanita Tietze
Retired Principal
Canton, Ohio

Norma Newman
Ysleta Independent School District
El Paso, Texas

William Rickenbach
Bethel Park School District
Bethel Park, Pennsylvania

Violet Cosgrove
Retired
Glen Burnie, Maryland

Danny McDougal
Pre-Mc, Inc.
Allen, Oklahoma

Bill Anderson
Administration Eagle Union
Zionsville, Indiana

Dan Thompson
Thompson Construction Company
Trinidad, Colorado

Nancy Gallagher
West Penn Power Company
Kittanning, Pennsylvania

William Hawes
The Hawes Company
Tucker, Georgia

Zhining Qin
Minnesota Department of Education
St. Paul, Minnesota

Charles McGee
Greenville County School District
Greenville, South Carolina

Barbara Bayne
Greenville County Schools District
Greenville, South Carolina

Landa McLaurin
Baltimore City Schools
Baltimore, Maryland

Bill Cramer, Jr.
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Attorneys at Law
Burns, Oregon

Nancy Potempa
St. Xavier University
Mokena, Illinois

Florencetine Jasmin
Baltimore City Public Schools
Baltimore, Maryland

(continued)

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Figure F-4 (continued)
Meeting Participants, NAEP Mathematics Achievement Level-Setting
Original Meeting, St. Louis, Missouri, March 20-24, 1992

Florence Kelly
Manville Board of Education
Manville, New Jersey

Philip Brach
University of the District of Columbia
Washington, D.C.

Larry Brown
Oil industry (Self-Employed)
Allen, Oklahoma

W. Garry Quast
Slippery Rock University
Slippery Rock, Pennsylvania

Carl Springfels
Consultant (Self-Employed)
Miami Shores, Florida

Anna Maria Golan
Santa Ana Unified
Fountain Valley, California

Ricardo Suarez
Lyford CISD
Raymondville, Texas

Figure F-5

Meeting Participants, NAEP Mathematics Achievement Level-Setting Follow-up Validation Meeting, Nantucket, Massachusetts, July 17-19, 1992

Charles Allen
Michigan Department of Education
Lansing, Michigan

Linda Brown
Van Zile Elementary School
Clinton Township, Michigan

Ellie Cucinatto
Bridgewater Public Schools
Bridgewater, Massachusetts

Jack Deal
Bethel Park School District
Pittsburgh, Pennsylvania

Paula Duckett
River Terrace Community School Board
Washington, DC

Edward Esty
SRI International
Washington, D.C.

Barbara Faltz-Jackson
Baltimore Public Schools
Baltimore, Maryland

Joan Ferini-Mundy
University of New Hampshire
Durham, New Hampshire

Marilyn Hala
National Council of Teachers of Mathematics
Washington, D.C.

Florence Kelly
Largo Public Schools
Largo, Florida
Henry Kepner
University of Wisconsin at Milwaukee
Milwaukee, Wisconsin

Charles McGee
Greenville Public Schools
Greenville, South Carolina

Landa McLaurin
Baltimore City Schools
Baltimore, Maryland

Gloria Moran
Williams Junior High School
Bridgewater, Massachusetts

Jo Ann Mosier
Kentucky Department of Education
Frankfort, Kentucky

Mary Norman
DeKalb County Board of Education
Decatur, Georgia

David Rank
Greenville Public Schools
Greenville, South Carolina

Sharon Steglein
Minnesota Department of Education
St. Paul, Minnesota

Appendix G

REPORT ON DEVELOPING ACHIEVEMENT LEVEL DESCRIPTIONS FOR THE 1996 NAEP SCIENCE ASSESSMENT

Mary Lyn Bourque
National Assessment Governing Board

Background

Principle 4 of the Board's policy states that the Board shall exercise its policy judgment in setting the levels. That is, the Board's statutory authority requires that it be the final judge in developing the achievement levels. In so doing, the Board uses a national consensus process, seeking advice from a broad audience. The preliminary descriptions, for example, are widely circulated as part of the assessment framework documents before adoption by the Board. Similarly, in designing the level setting process the Board solicits broad input from relevant professional organizations, the technical community, and others. And after the proposed levels are recommended, they are generally widely circulated for comment and reflection by stakeholder groups, policymakers, content specialists, and others.

The Board's current decision in science considered several evaluative features of the student performance standards, including the reasonableness of the levels, whether they are valid, and whether they are likely to be useful to the public in interpreting the NAEP data. These evaluation criteria are part of the authorizing legislation, and are among the criteria against which the National Academy of Sciences will judge their merit.

Before adopting achievement levels in a particular subject area, the Board examines relevant extant data from other sources to inform the decision and to place it in a broader context. In the case of the 1996 science, the Board examined other data sources, including Advanced Placement (AP) science data for the grade 12 cohort; Third International Mathematics and Science Study (TIMSS) data for grade 8; and performance standards already set by the Board in reading, mathematics, U.S. history, and geography. They also examined the individual ratings of panelists who participated in the ACT level setting process.

In the final analysis, the Board adopted cut scores at points on the scale they judged to be reasonable, taking other available information into account. The interim cut points on the NAEP scale varied from those generated through the level setting process in non-systematic ways: some were higher than the recommendations; some were lower. Consequently, the relationships between the interim cut scores and the content descriptions was not clear.

Therefore, the Board determined that a further examination of the descriptions was necessary, either to modify those that existed, or to craft new ones that would be more consistent with the policy definitions, the framework, and the item pool used to measure the 1996 NAEP science performance. In this way, the Board could have some assurance that the descriptions would be providing a proper interpretation of the interim cut scores of *what students know and can do* at the various achievement levels. This report provides a summary of the process used to develop the descriptions of the levels, as well as the results of this initiative from a meeting convened in St. Louis, Missouri from June 19 through June 22, 1997.

Panel Selection

The plan called for convening about 24 content experts who have knowledge of what students in the respective grades can do and are capable of doing in elementary, middle school, and secondary school science. Generally teachers, curriculum specialists, and science educators are in the best position to make these kinds of judgments. The Board-approved plan also called for some number of noneducators, though a proportionally smaller number than is typically used in the level setting process. The Advisory Committee on Education Statistics (ACES) who provides technical advice to the Board, recommended that the grade level groups include at least 5 panelists (rather than 4 as was suggested in the original plan).

A combination of two sources of experts was used to identify participants: (1) states who had participated in the 1996 NAEP state assessments; and (2) an American College Testing (ACT) sample previously identified for the various panels which ACT assembles in conducting its work for the Board under the achievement level setting contract. Thirty-two state assessment directors were contacted and encouraged to submit the name of one person who would represent their state at the meeting. Twenty-three states responded by electing to send a participant, with one state (MA) electing to send two, and another state (TX) sending three representatives. Participating jurisdictions are shown in Figure G-1.

Figure G-1
Participating Jurisdictions in Developing Achievement Level
Descriptions for the 1996 NAEP Science Assessment

Alabama
Alaska
Arizona
Connecticut
Delaware
District of Columbia
Georgia
Hawaii
Louisiana
Maine
Massachusetts
Minnesota
Montana
Nebraska
Nevada
North Dakota
New York
Rhode Island
Tennessee
Texas
Utah
Virginia
Washington

Because some states in the initial sample were not able to send a representative, the multiple participants from a single state were honored. In addition, three noneducator panelists participated, taken from the sample of nine nominees supplied by ACT. The total number of panelists was 28. Participants were given the opportunity to select the grade level to which they wished to be assigned in a pre-registration interview. They were given their first choice in all cases, and randomly assigned to one of the two parallel groups (either Group A or Group B), ensuring that male participants and noneducators were assigned throughout the groups (since there were fewer participants in both categories).

Study Design

The plan approved by the Board called for two independent panels to conduct this work. Each panel was composed of 14 persons, assigned to grade level groups of 4 or 5 persons per grade. All participants were provided the same training and were asked to complete the same tasks. The design of two independent panels was for purposes of embedding a validity check into the process, which, if successful, would provide a built-in replication study. Panelists were asked in the opening plenary session to honor the independent groups design and to refrain from discussing their work with members of the other group until it was appropriate to do so, on the last day.

The plan was implemented as a multi-step process, with individual judgments being the focus of Day 2, within-grade consensus the focus of Day 3, and cross-grade, cross-level consistency being the focus of Day 4. Further, it was made clear to the panelists that this was an empirically-based design insofar as data based on actual student performances was the basis for developing the descriptions of *what students know and can do* at each level.

Materials

Prior to the meeting panelists were sent copies of the 1996 NAEP science assessment framework. They referred to this regularly during the course of their work. In addition, on Day 2 they were given the item anchor book from which they would do all their work. The items in a given grade level appeared in the anchor book in the order in which they map to the NAEP scale, from easiest to hardest. In addition, panelists were given an index listing of the items in the same order as the anchor book, copies of the policy definitions, and forms on which they could submit the work of Day 2 and Day 3.

Training

Panelists were trained simultaneously to insure standardized exposure to all relevant information needed to accomplish the task. Since all panelists were not equally familiar with NAEP and NAGB, a brief introduction was provided covering such topics as the scope of the framework, the nature of the item pool, a non-technical summary of NAEP scaling and item mapping, and instructions on how to read the information provided in the anchor binders containing all the items, from easiest to hardest.

During the first plenary session, panelists were given an overview of NAEP and NAGB, and had the tasks of the next three days presented in summary form. The training focused on giving them a level of comfort with the tasks they were going to be doing, introducing the scope of the 1996 NAEP science assessment, with a full explanation of the content of the assessment, the vocabulary peculiar to NAEP, e.g., "blocks of exercises," and the chronology of the 1996 NAEP assessment. It was important for panelists to understand where they were coming into the process, that the assessment had already been administered, scored, scaled, and reported. The achievement levels remained the only unfinished aspect of the science assessment.

On Day 2 the agenda called for a plenary session to provide specific training in the task of making independent judgments about the content represented by the items at the grade level. Though not described in these terms, this activity was designed to provide panelists with first-hand knowledge of the contents of the NAEP assessments, the kinds of items used, the manner of scoring the items, and the performance of students on average, at the borderline of *Basic, Proficient, and Advanced*, and across the levels. The time spent in reviewing each item without the assistance of other panelists forced each participant to deal with the notion of item difficulty without being influenced by others, and with the idea of operationalizing the Board's policy definitions. The real goal of Day 2, though not formally stated to panelists, was to train them in the item pool. Requiring each panelist to make an individual judgment about each item was more likely to have them read and try to understand the cognitive demand of the items than would the simpler task of reading the items thoughtfully.

Panelists were directed to start with the items in the *Basic* level, those items falling between the lower and upper borderline for *Basic* (according to the interim levels adopted by the Board), and generate *working lists* of general statements representing the content of the assessment. They could generate these lists by clustering similar content together and developing generalized statements which summarized that content. When they had completed this part of the task, they were asked to compare the results with the policy definition for *Basic*, i.e., *partial mastery of the prerequisite knowledge and skill fundamental for proficient work.* The consistency check between the descriptions and the definitions was encouraged on an holistic basis, not an item-by-item basis. The question to be answered was, "Does this description, *in general*, reflect the policy definition?", not "Does this item, and this item, etc., reflect the policy definition?" If the panelist was satisfied with the general consistency between the two, they could move on to the next level, *Proficient*, and repeat the process; then to *Advanced*, and repeat the process a third time. The product for Day 2 was a working list of statements for each level from each participant. The grade 4 panelists reviewed 226 items in this process; grades 8 and 12 reviewed 312 items each.

During the training panelists were given suggestions for verbs that could be used to indicate increasing knowledge and skills from one level to the next, as well as common phrases that are also indicators of hierarchical skill levels and increasing levels of sophistication in the knowledge domain. These linguistic features had been used in the past in other anchoring settings and were judged to be useful in this one as well. Panelists were not required to use these words, but most found them helpful in completing the task.

Panelists were also trained in how to "read" the data accompanying each item. The scale value for the item using a response probability (rp) criterion of .65 was explained, as well as the differences between the "borderline" p-values and the "across the range" p-values. The training also focused on the differences between a constructed response coded [2] or partial, and those coded [3] or [4], complete.

Finally, panelists were led through a set of about 10 items as a model for the task they were about to complete, demonstrating how to use the data, judge the difficulty of the items, and write statements using the linguistic suggestions.

Day 3 was designed to have the grade level panels confer and reach group agreement on the initial descriptions for *Basic, Proficient, and Advanced* at grades 4, 8, and 12. As on the previous day, the plenary session in the morning was focused on the groups' task. They were instructed to start by reading each other's lists from the work of Day 2. They were then to select those statements from the lists for which there was general group agreement, and to return to the remaining statements where there was lack of agreement and work them through to inclusion or exclusion, in the end creating a group master working list for *Basic*. They needed to ensure that *in general* the master list was consistent with the policy definition for *Basic*, before they could move on to the *Proficient or Advanced* levels. Each group worked between the individual lists created the previous day and flip charts of the master lists. For tracking purposes, groups were encouraged to list the items that were the underpinnings for their statements, thus creating a "paper trail", as it were, for the statements in the lists. The product for Day 3 was a working list for the three levels for each grade level group.

Day 4 training was focused on achieving clarity in the statements, examining consistency across levels, across grades, and with the policy definitions. Panelists were organized conference style which supported group discussion and consensus-building. Panelists were asked to track the general statements found to be inconsistent, as well as the associated items, so that a "paper trail" existed for the content judged to be irregular or inappropriately placed at a particular level. Such anomalies would be handled at the end of the work session if necessary.

Results

The results of the initiative can be found in Figures G-2, G-3, and G-4 below. These are the narrative versions of the results, which have been professionally edited and returned to the panelists for their concurrence. Table G-1 shows the percentages of panelists who approved the narratives.

Figure G-2

1996 NAEP Science Achievement Level Descriptions

Grade 4

Cut Score	Content Descriptions*
Basic **138**	Students performing at the Basic level demonstrate some of the knowledge and reasoning required for understanding of the earth, physical, and life sciences at a level appropriate to Grade 4. For example, they can carry out simple investigations and read uncomplicated graphs and diagrams. Students at this level also show a beginning understanding of classification, simple relationships, and energy. Fourth-grade students performing at the Basic level are able to follow simple procedures, manipulate simple materials, make observations, and record data. They are able to read simple graphs and diagrams and draw reasonable but limited conclusions based on data provided to them. These students can recognize appropriate experimental designs, although they are unable to justify their decisions. When presented with diagrams, students at this level can identify seasons; distinguish between day and night; and place the position of the Earth, sun, and planets. They are able to recognize major energy sources and simple energy changes. In addition, they show an understanding of the relationship between sound and vibrations. These students are able to identify organisms by physical characteristics and group organisms with similar physical features. They can also describe simple relationships among structure, function, habitat, life cycles, and different organisms.
Proficient **170**	Students performing at the Proficient level demonstrate the knowledge and reasoning required for understanding of the earth, physical, and life sciences at a level appropriate to Grade 4. For example, they understand concepts relating to the Earth's features, physical properties, and structure and function. In addition, student can formulate solutions to familiar problems as well as show a beginning awareness of issues associated with technology. Fourth-grade students performing at the Proficient level are able to provide an explanation of day and night when given a diagram. They can recognize major features of the Earth's surface and the impact of natural forces. They are also able to recognize water in its various forms in the water cycle and can suggest ways to conserve it. These students recognize that various materials possess different properties that make them useful. Students at this level are able to explain how structure and function help living things survive. They have a beginning awareness of the benefits and challenges associated with technology and recognize some human effects on the environment. They can also make straightforward predictions and justify their position.
Advanced **204**	Students performing at the Advanced level demonstrate a solid understanding of the earth, physical, and life sciences as well as the ability to apply their understanding to practical situations at a level appropriate to Grade 4. For example, they can perform and critique simple investigations, make connections from one or more of the sciences to predict or conclude, and apply fundamental concepts to practical applications. Fourth-grade students performing at the Advanced level are able to combine information, data, and knowledge from one or more of the sciences to reach a conclusion or to make a valid prediction. They can also recognize, design, and explain simple experimental procedures. Students at this level recognize nonrenewable sources of energy. They also recognize that light and sound travel at different speeds. These students understand some principles of ecology and are able to compare and contrast life cycles of various common organisms. In addition, they have a developmental awareness of the benefits and challenges associated with technology.

*Shaded areas indicate summary of content descriptions.

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Figure G-3

1996 NAEP Science Achievement Level Descriptions
Grade 8

Cut Score	Content Descriptions
Basic **143**	Students performing at the Basic level demonstrate some of the knowledge and reasoning required for understanding of the earth, physical, and life sciences at a level appropriate to Grade 8. For example, they can carry out investigations and obtain information from graphs, diagrams, and tables. In addition, they demonstrate some understanding of concepts relating to the solar system and relative motion. Students at this level also have a beginning understanding of cause-and-effect relationships. Eighth-grade students performing at the Basic level are able to observe, measure, collect, record, and compute data from investigations. They can read simple graphs and tables and are able to make simple data comparisons. These students are able to follow directions and use basic science equipment to perform simple experiments. In addition, they have an emerging ability to design experiments. Students at this level have some awareness of causal relationships. They recognize the position of planets and their movement around the sun and know basic weather-related phenomena. These students can explain changes in position and motion such as the movement of a truck in relation to that of a car. They also have an emerging understanding of the interrelationships among plants, animals, and the environment.
Proficient **170**	Students performing at the Proficient level demonstrate much of the knowledge and many of the reasoning abilities essential for understanding of the earth, physical, and life sciences at a level appropriate to Grade 8. For example, students can interpret graphic information, design simple investigations, and explain such scientific concepts as energy transfer. Students at this level also show an awareness of environmental issues, especially those addressing energy and pollution.. Eighth-grade students performing at the Proficient level are able to create, interpret, and make predictions from charts, diagrams, and graphs based on information provided to them or from their own investigations. They have the ability to design an experiment and have an emerging understanding of variables and controls. These students are able to read and interpret geographic and topographic maps. In addition, they have an emerging ability to use and understand models, can partially formulate explanations of their understanding of scientific phenomena, and can design plans to solve problems. Students at this level can begin to identify forms of energy and describe the role of energy transformations in living and nonliving systems. They have knowledge of organization, gravity, and motions within the solar system and can identify some factors that shape the surface of the Earth. These students have some understanding of properties of materials and have an emerging understanding of the particulate nature of matter, especially the effect of temperature on states of matter. They also know that light and sound travel at different speeds and can apply their knowledge of force, speed, and motion. These students demonstrate a developmental understanding of the flow of energy from the sun through living systems, especially plants. They know that organisms reproduce and that characteristics are inherited from previous generations. These students also understand that organisms are made up of cells and that cells have subcomponents with different functions. In addition, they are able to develop their own classification system based on physical characteristics. These students can list some effects of air and water pollution as well as demonstrate knowledge of the advantages
Advanced **207**	Students performing at the Advanced level demonstrate a solid understanding of the earth, physical, and life sciences as well as the abilities required to apply their understanding in practical situations at a level appropriate to Grade 8. For example, students perform and critique the design of investigations, relate scientific concepts to each other, explain their reasoning, and discuss the impact of human activities on the environment. Eighth-grade students performing at the Advanced level are able to provide an explanation for scientific results. They have a modest understanding of scale and are able to design a controlled experiment. These students have an understanding of models as representations of natural systems and can describe energy transfer in living and nonliving systems. Students at this level are able to understand that present physical clues, including fossils and geological formations, are indications that the Earth has not always been the same and that the present is a key to understanding the past. They have a solid knowledge of forces and motions within the solar system and an emerging understanding of atmospheric pressure. These students can recognize a wide range of physical and chemical properties of matter and some of their interactions and understand some of the properties of light and sound. Also, they can infer relationships between structure and function. These students know the differences between plant and animal cells and can apply their knowledge of food as a source of energy to a practical situation. In addition, they are able to explain the impact of human activities on the environment and the economy.

*Shaded areas indicate summary of content descriptions.

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Figure G-4
1996 NAEP Science Achievement Level Descriptions
Grade 12

Cut Score	Content Descriptions*
Basic **145**	Students performing at the Basic level demonstrate some knowledge and certain reasoning abilities required for understanding of the earth, physical, and life sciences at a level appropriate to Grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, patterns of change) required for understanding the most basic relationships among the earth, physical, and life sciences. They are able to conduct investigations, critique the design of investigations, and demonstrate a rudimentary understanding of scientific principles. Twelfth-grade students performing at the Basic level are able to select and use appropriate simple laboratory equipment and write down simple procedures that others can follow. They also have a developmental ability to design complex experiments. These students are able to make classifications based on definitions such as physical properties and characteristics. Students at this level demonstrate a rudimentary understanding of basic models and can identify some parts of physical and biological systems. They are also able to identify some patterns in nature and rates of change over time. These students have the ability to identify basic scientific facts and terminology and have a rudimentary understanding of the scientific principles underlying such phenomena as volcanic activity, disease transmission, and energy transformation. In addition, they have some familiarity with the application of technology.
Proficient **178**	Students performing at the Proficient level demonstrate the knowledge and reasoning abilities required for understanding of the earth, physical, and life sciences at a level appropriate to Grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, patterns of change) required for understanding how these themes illustrate essential relationships among the earth, physical, and life sciences. They are able to analyze data and apply scientific principles to everyday situations. Twelfth-grade students performing at the Proficient level are able to demonstrate a working ability to design and conduct scientific investigations. They are able to analyze data in various forms and utilize information to provide explanations and to draw reasonable conclusions. Students at this level have a developmental understanding of both physical and conceptual models and are able to compare various models. They recognize some inputs and outputs, causes and effects, and interactions of a system. In addition, they can correlate structure to function for the parts of a system that they can identify. These students also recognize that rate of change depends on initial conditions and other factors. They are able to apply scientific concepts and principles to practical applications and solutions for problems in the real world and show a developmental understanding of technology, its uses, and its applications.
Advanced **210**	Students performing at the Advanced level demonstrate the knowledge and reasoning abilities required for a solid understanding of the earth, physical, and life sciences at a level appropriate to Grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, patterns of change) required for integrating knowledge and understanding of scientific principles from the earth, physical, and life sciences. Students can design investigations that answer questions about real-world situations and use their reasoning abilities to make predications. Twelfth-grade students performing at the Advanced level are able to design scientific investigations to solve complex, real-world situations. They can integrate, interpolate, and extrapolate information embedded in data to draw well-formulated explanations and conclusions. They are also able to use complex reasoning skills to apply scientific knowledge to make predictions based on conditions, variables, and interactions. Students at this level recognize the inherent strengths and limitations of models and can revise models based on additional information. They are able to recognize cause-and-effect relationships within systems and can utilize this knowledge to make reasonable predictions of future events. These students are able to recognize that patterns can be constant, exponential, or irregular and can apply this recognition to make predictions. They can also design a technological solution for a given problem.

*Shaded areas indicate summary of content descriptions.

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Table G-1
Percentage[1] of Panelists Approving the Edited Versions of the Descriptions (Narrative Format)

	Grade 4	Grade 8	Grade 12
Group A	100%	100%	67%
Group B	100	100	100
Total	100	100	80

The descriptions have been reviewed by the three science specialists who facilitated the meeting. In general, there are few differences to be noted between the results for Group A and Group B, though, according to one reviewer, Group B's statements tend to be more general than Group A's. Even though the descriptions were produced *on-site*, without benefit of time to be very selective in language and style, and the opportunity to conduct careful checks across grades and levels, they are remarkably consistent one to another. However, the consensus among reviewers is that Group A's descriptions are probably more consistent both within and across grades than Group B's, as well as more complete in terms of representing the items in the pool than Group B's.

Evaluation

Panelists were asked to complete an evaluation questionnaire at the end of the process. The purpose of the evaluation was to accomplish two goals: (1) provide feedback regarding the panelists' opinion about the consistency of the achievement levels descriptions across levels and grades, as well as between the descriptions and the policy definitions; and (2) provide feedback on the *interim* cut scores and the percentage of students at or above the levels. The questions covering the latter were adapted from an evaluation questionnaire used by ACT in conducting the achievement level setting process. It should be noted that the Board-approved plan did not allow for providing consequences data to the panelists during the working sessions. However, consequences data were presented on the evaluation questionnaire during the debriefing segment of the meeting when it could in no way influence the results.

The first eight questions dealt with consistency. Panelists provided a rating from [1] *not at all consistent*, to [5] *very consistent*. In examining differences between the two parallel groups, [A] and [B], Group [B] reports slightly more consistency than does Group [A]. Within Group [A], the grade 12 group reports less consistency in all comparisons than either grades 4 or 8.

The questionnaire also asked a series of questions which were adapted from the ACT questionnaires regarding the cut scores adopted on an interim basis, the percentage of students at or above the levels, and the achievement levels descriptions. Additionally, the questionnaire gave panelists the opportunity to recommend *no changes* in the cut scores and thus leaving the percentages of students who score at or above the levels as presented, or to recommend *smaller or larger percentages* of students who should score at or above the levels and consequently changing the cut scores. Opinion was split evenly among those who would not change the cut scores and those who would either raise or lower the cut scores.

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[1] Percentages based on the total number of respondents, not necessarily the total number of panelists.

The final question asked panelists to take a position regarding the recommendations they wished to make to the National Assessment Governing Board regarding the achievement level descriptions. The majority of panelists (between 64% and 71%) recommended that the achievement levels adopted by the Board on an interim basis, and which were used to develop the achievement levels descriptions, be reported.

Summary and Recommendations

The Board's plan called for describing the performance of students within the ranges on the NAEP scale for the achievement levels adopted by the Board on an interim basis. This report provides the results of the Board's plan as carried out by this process. These descriptions represent *what students know and can do* within the achievement level ranges of *Basic, Proficient, and Advanced.*

It is recommended that, should the Board adopt the *interim* levels on a permanent basis for the 1996 NAEP science achievement levels, then these descriptions should be adopted to assist in the proper interpretation of the NAEP scores. It is also recommended that in the Board's report on the levels, the differences between these descriptions on the 1996 NAEP science assessment of what *students know and can do* and achievement levels descriptions in other NAEP content areas of what *students should know and be able to do*, needs to be made clear to the readers. Additionally, it is recommended that the exemplar items (in a separate document) which are typical of student performances for each level accompany the cut scores and descriptions to assist in the proper interpretation of the NAEP scores.

Finally, a word about the Group A and Group B descriptions. The purpose of the parallel working groups was to provide the Board with some evidence that the resulting descriptions were not idiosyncratic to a particular set of panelists. The evidence points to the fact that either set of descriptions could be used in the report. However, since the Group A descriptions seem to be slightly more internally consistent, it is recommended that Group A's become the *official* set, and Group B's be viewed as the validation set, and not used to report the achievement levels results.

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Appendix H

THE INFORMATION WEIGHTING ERROR

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American College Testing

The Error

In the process of recomputing the reading cutscores set in 1992 for the three achievement levels, an error in the information weighting function was detected. The error affected data for all achievement levels set in 1992: reading and mathematics. The Muraki information weighting function published in 1993 was used in the 1994 programs to compute achievement levels, so only 1992 levels are affected.

The procedures used for 1992 were printed and reported in numerous places. No one had detected an error. The psychometrician who developed the programs for the 1994 process used Muraki's information weighting function because he found it to be more straightforward than the 1992 procedure.

The 1992 equation[1] is as follows:

$$I_j(\theta) = D^2 a_j{}^2 \sum_{c=1}^{m_j} .$$

The 1994 equation is as follows:

$$I_j(\theta) = D^2 a_j^2 \sum_{c=1}^{m_j} [T_c - \overline{T}_j(\theta)]^2 P_{jc}(\theta) ,$$

where $\overline{T}$ is the expected score for item j or proficiency θ

$$\overline{T}_j(\theta) = \sum_{c=1}^{m_j} T_c P_{jc}(\theta) ,$$

and T_c is the score assigned to the response category c.

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[1] Notations for this equation were modified to correspond to those of Equation 2. The reader will need to refer to the articles (Luecht, 1993, and Muraki, 1993) for a complete explanation of the equations.

Analysis of the Error: Magnitude

The differences in achievement levels reported for 1992 and the corrected achievement levels are due both to the error in item parameters and to the error in information weights. The cutscores and percentages of students scoring at or above each for each achievement level are reported in Tables H-1 and H-2. Data in Table H-1 are the previously reported (incorrect) data, and data in Table H-2 are the corrected data.

Table H-1

Mathematics Cutpoints and Percents At or Above as Reported

Grade		Basic	Proficient	Advanced
4	Cutpoint	211	248	280
	%≥92 Dist	61	18	2
8	Cutpoint	256	294	331
	%≥92 Dist	63	25	4
12	Cutpoint	287	334	366
	%≥92 Dist	64	16	2

Table H-2

Corrected Mathematics Cutpoints and Percents At or Above as Reported

Grade		Basic	Proficient	Advanced
4	Cutpoint	214	249	282
	%≥92 Dist	59	18	2
8	Cutpoint	262	299	333
	%≥92 Dist	58	21	3
12	Cutpoint	288	336	367
	%≥92 Dist	64	15	2

The corrected cutscores are consistently the same or higher than those previously reported. The maximum difference in cutscores originally reported and the corrected cutscores is found for grade 8 at the Basic level:

((original cutscore = 256) - (corrected cutscore = 262)) = -6 points.

The differences attributable to each error (parameter estimates and information weighting) appear to be rather small in most cases.

Table H-3 reports the differences in cutscores due to the two errors, examined one at a time. Relative to the *correct* data, the information weighting error generally resulted in a lower composite cutscore, and the recoding error resulting in incorrect item parameters generally resulted in an even lower composite cutscore.

Table H-3

Composite NAEP Scale Cutpoint Differences in Mathematics Due to Errors

Achievement Level Cutpoint	Information Weighting[1]	Item Parameters[2]
Grade 4		
Basic	-2	-5
Proficient	-1	-1
Advanced	-1	-1
Grade 8		
Basic	-4	-8
Proficient	-3	-2
Advanced	-1	-2
Grade 12		
Basic	0	-4
Proficient	-1	-2
Advanced	-1	-2

[1] Difference = Incorrect - Correct, based on correct item parameters. If the recoding of data had been correct, the cutpoints would have been in error by these amounts, due to the incorrect information weighting function.

[2] Difference = Incorrect - Correct, based on correct information weights. If the correct information weighting function had been used, the cutpoints would have been in error by these amounts due to the recoding error resulting in incorrect item parameters.

Table H-4 shows comparisons of percentages of students who scored at or above each achievement level in 1992. The center row for each grade shows student performance relative to each achievement level in 1992 using both correct item parameters and correct information weights. The first row for each grade shows student performance relative to achievement levels computed with the *correct* item parameters and *incorrect* information weights. The third row for each grade shows student performance relative to achievement levels computed with the *incorrect* item parameters and the *correct* information weights.

Table H-4

NAEP Mathematics Achievement Levels: Cutpoints and 1992 Distribution Data

GRADE 4

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	212	248	281	62.2	19.7	2.1
Correct Data, Correct Weight	214	249	282	60	18.7	1.9
Incorrect Data, Correct Weight	209	248	281	65.6	19.7	2.1

GRADE 8

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	258	296	332	62.6	24.4	3.6
Correct Data, Correct Weight	262	299	333	58.6	21.8	3.3
Incorrect Data, Correct Weight	254	297	331	66.5	23.5	3.8

GRADE 12

	Cutpoint			Percent At or Above Cutpoint		
	Basic	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
Correct Data, Incorrect Weight	288	335	366	64.8	16.1	1.9
Correct Data, Correct Weight	288	336	367	64.8	15.4	1.8
Incorrect Data, Correct Weight	284	334	364	68.7	16.9	2.3

Analysis of the Error: The Information Weighting Functions

Various analyses were conducted to determine what, if any, general conclusions could be drawn to help inform users of NAEP achievement levels data about the factors related to differences in cutscores due to the information weighting error.

Item ratings are collected from two groups of panelists at each grade level. These groups are called item rating groups, and panelists are assigned to an item rating group so that the two are as equivalent as possible in terms of panelist type (teacher, career educator, or general public; gender; race/ethnicity; and region of residence). These item rating groups rate slightly over half of all items at their grade level. Item rating pools are developed so that the items in each are as equivalent as possible in terms of item difficulty, item format (multiple choice, short constructed response, and extended constructed response), test time for the block, and so forth. Item blocks remain intact for the item rating pools. At least one block (a "common block") is rated by all panel members (i.e., both item rating groups, in the grade group).

Item ratings are placed on the NAEP scale by computing a theta value for the dichotomous items and for the polytomous items in each subscale for each rating group. Information weights are applied for the polytomous items at the subscale level before computing the subscale score for both dichotomous and polytomous items.

Table H-5 presents the information weights computed for each rating group for the mathematics NAEP achievement levels. Those data show that there is a *consistent* pattern of error caused by the incorrect information function for math. Analyses of the data from 1992 and 1994 Trial State Assessments in reading show the corrected cutscores are consistently neither higher nor lower as a result of this error, although the impact of the error was generally to estimate a higher cutscore for the polytomous items. Simulated item parameters were used to demonstrate that there was no consistent effect of the incorrect information function on weights used to form the final composite cutpoints.

Analysis of the Effect of Item Discrimination

Figures H-1 through H-3 show graphs for the correct and the incorrect information functions holding other parameters constant while varying the item discrimination parameter in the generalized partial credit item response theory (IRT) model. In general, the differences between correct and incorrect weights increase as item discrimination increases.

These figures show no consistent pattern in the direction (positive or negative) of the difference between the correct and incorrect information function based on item discrimination. When the correct information function is greater than the incorrect function, we observe that information is in the area of maximum information. It is not the case, however, that the correct function always results in a greater information weight where information is maximized.

Table H-5

Comparison Between the Incorrect and Correct Information Weights for 1992 Mathematics Achievement Levels Based on Corrected Item Parameters

Grade	Rating Group	Scale	Basic Incorrect	Basic Correct	Basic Diff	Proficient Incorrect	Proficient Correct	Proficient Diff	Advanced Incorrect	Advanced Correct	Advanced Diff
4	A	1	0.24	0.80	-0.57	0.22	0.70	-0.48	0.14	0.25	-0.11
		3	0.22	0.39	-0.16	0.21	0.33	-0.12	0.21	0.32	-0.11
		5	0.34	0.77	-0.42	0.32	0.61	-0.29	0.30	0.50	-0.20
	B	1	0.26	0.66	-0.40	0.25	0.57	-0.32	0.22	-.40	-0.18
		4	0.51	1.10	-0.59	0.49	0.96	-0.47	0.50	1.01	-0.51
8	A	1	0.72	1.23	-0.51	0.76	1.57	-0.81	0.63	1.00	-0.37
		3	1.05	1.79	-0.74	1.08	2.00	-0.92	1.05	1.82	-0.76
	B	2	0.50	1.25	-0.75	0.47	1.11	-0.64	0.39	0.78	-0.39
		4	1.04	2.85	-1.81	0.94	2.19	-1.24	0.83	1.59	-0.76
		5	0.41	1.31	-0.90	0.32	0.92	-0.60	0.27	0.69	-0.42
12	A	3	0.13	0.29	-0.16	0.13	0.29	-0.16	0.13	0.29	-0.16
		4	0.17	0.37	-0.21	0.16	0.36	-0.20	0.15	0.26	-0.11
		5	1.59	4.11	-2.52	1.69	4.82	-3.17	1.67	4.77	-3.09
	B	5	1.41	2.60	-1.19	1.52	3.60	-2.09	1.43	3.26	-1.83

Figure H-1

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=.2, b=0, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categories

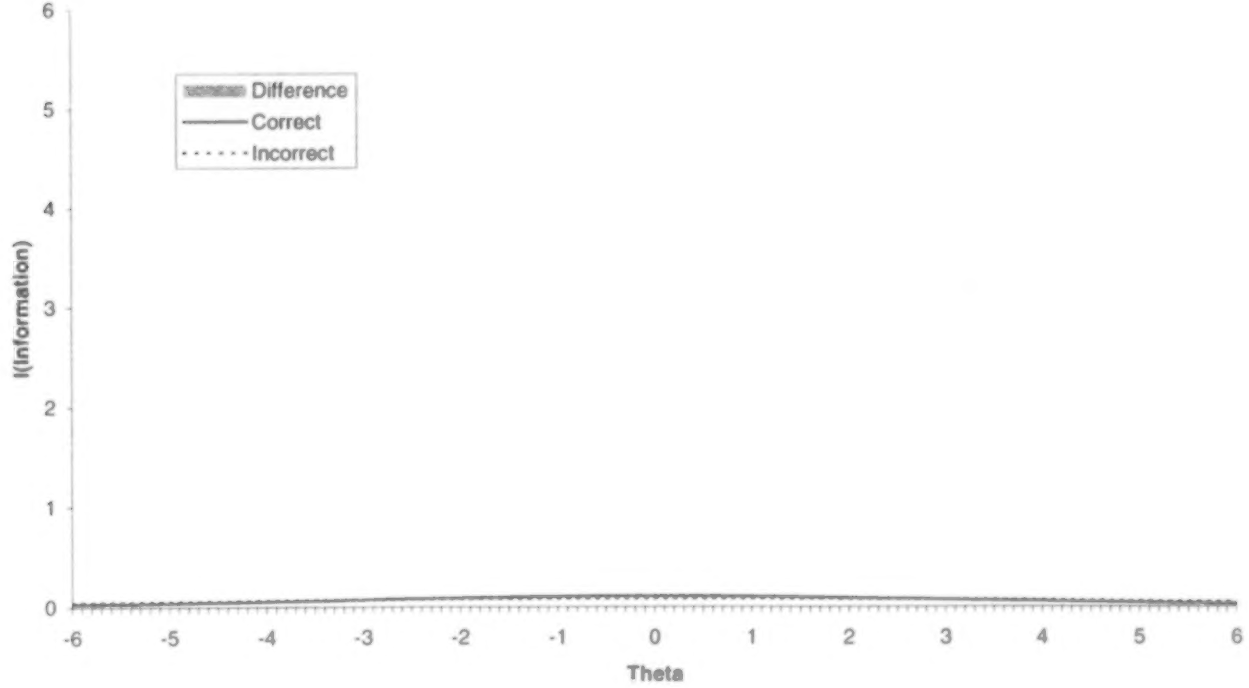


Figure H-2

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=.5, b=0, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categories

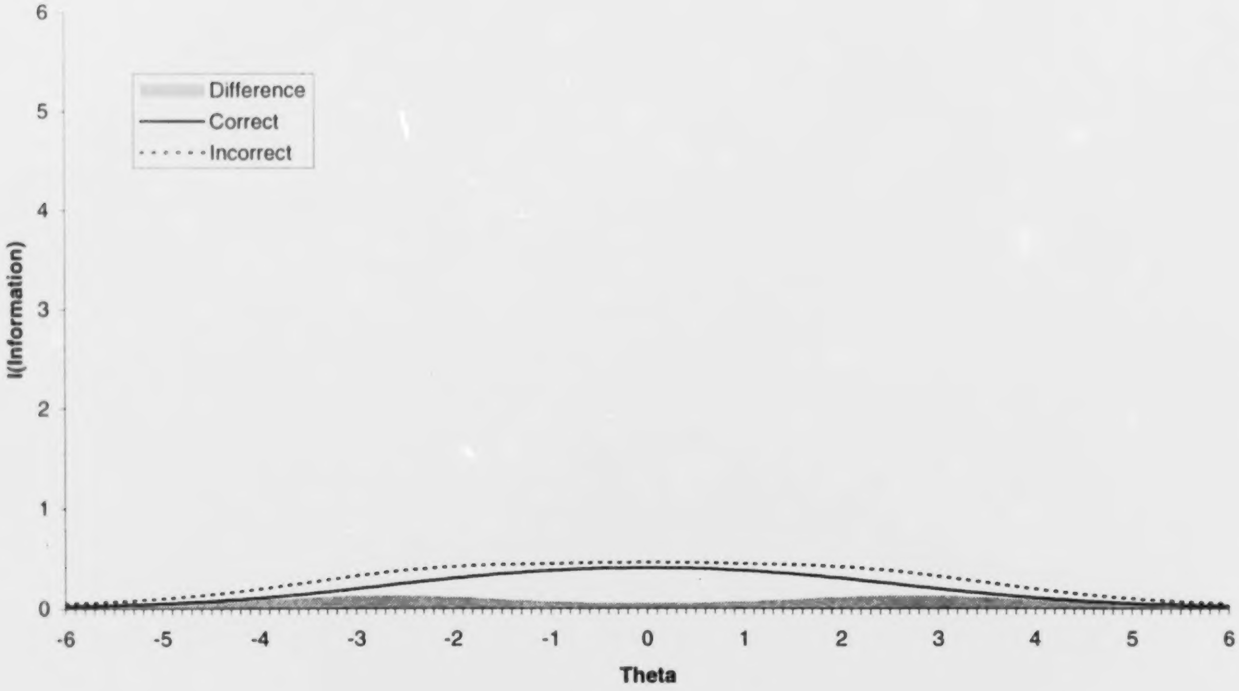
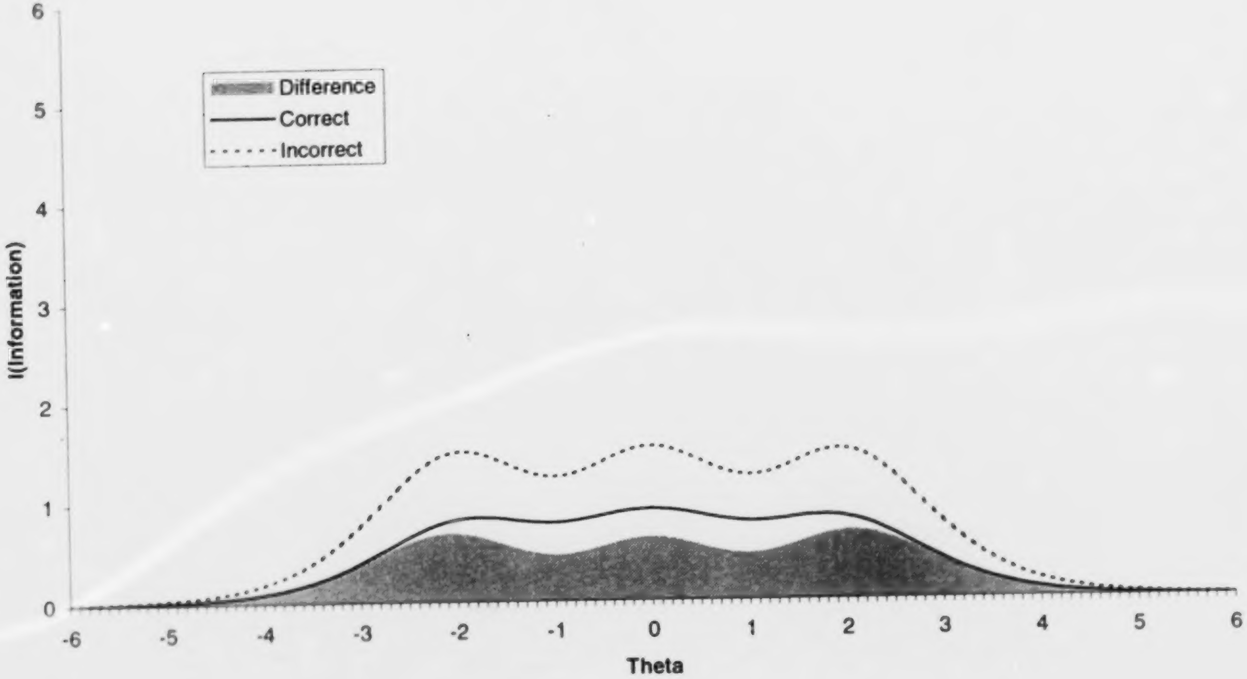


Figure H-3

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1, b=0, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categories



Analysis of the Effect of Location Parameters

Figures H-4 through H-6 show the correct and incorrect information weighting functions for varying location parameters. The location parameters only shift the distribution of information, and that is the case for both the correct and incorrect information weighting functions. The amount of difference between the two is unchanged; only the locations change.

Analysis of the Effect of the Threshold Parameters.

If the threshold parameters are close, in terms of the locations of ICCs, the correct information function will have a high peak. In the area of maximum information, i.e. around the peak of the distribution, the incorrect information function underestimates information.

As can be seen in Figures H-6 through H-8, when the threshold parameters are relatively far apart, the information is relatively low and the distribution is multimodal. When the threshold parameters are closer information is higher and the distribution tends to be more unimodal. As the threshold parameters move even closer, the difference between the correct and incorrect information functions increases. As the threshold parameters become closer, the rate at which the incorrect weighting function increments weights at the peak of the distribution is slower than that for the correct function. This results in a negative difference between the two functions in the area of maximum information.

Analysis of the Error: Conclusions

Three general conclusions can be drawn from our analyses:

1. No consistent pattern of over- or underestimation can be predicted from the error in information weights. Generally, the incorrect information weighting function results in a lower information weight for 1992 mathematics assessment items, whereas, it results a higher information weight for 1992 reading assessment items.

2. The difference between the correct and incorrect weights increases as item discrimination increases.

3. The impact of the incorrect information weighting function on the cutscores is not consistent. The impact depends upon the location of the cutscore and the relative weight of the dichotomous items.

Figure H-4

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categories

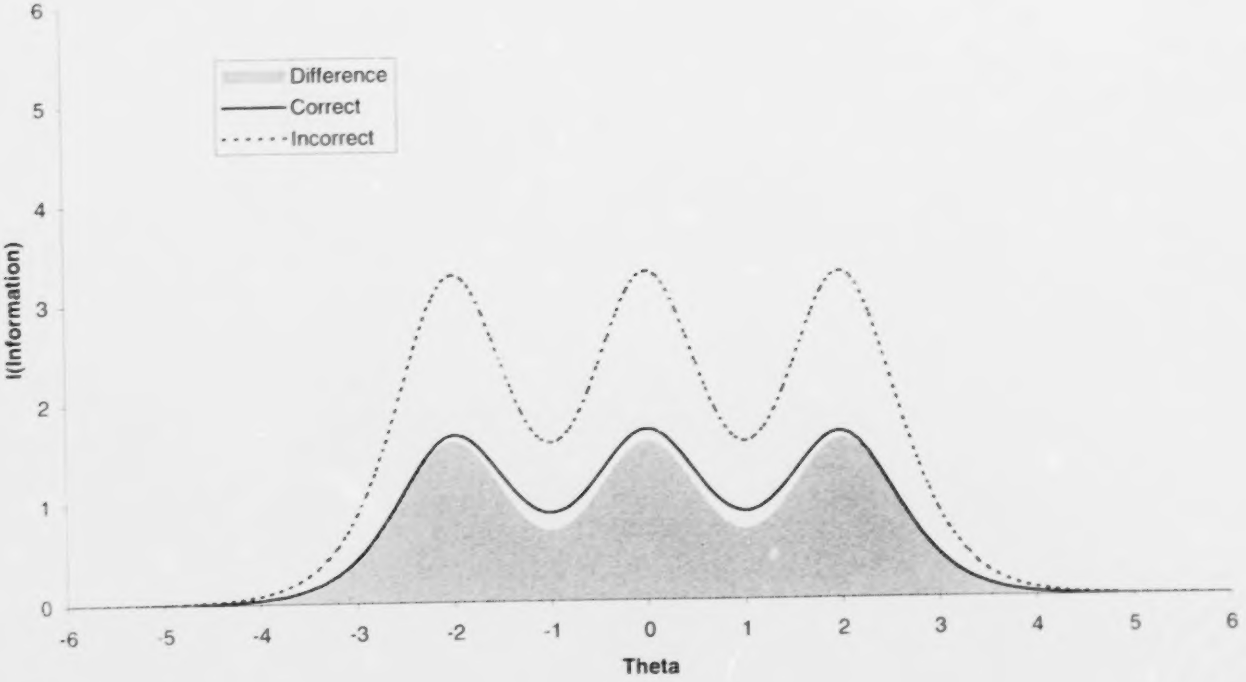


Figure H-5

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=-1, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categoreis

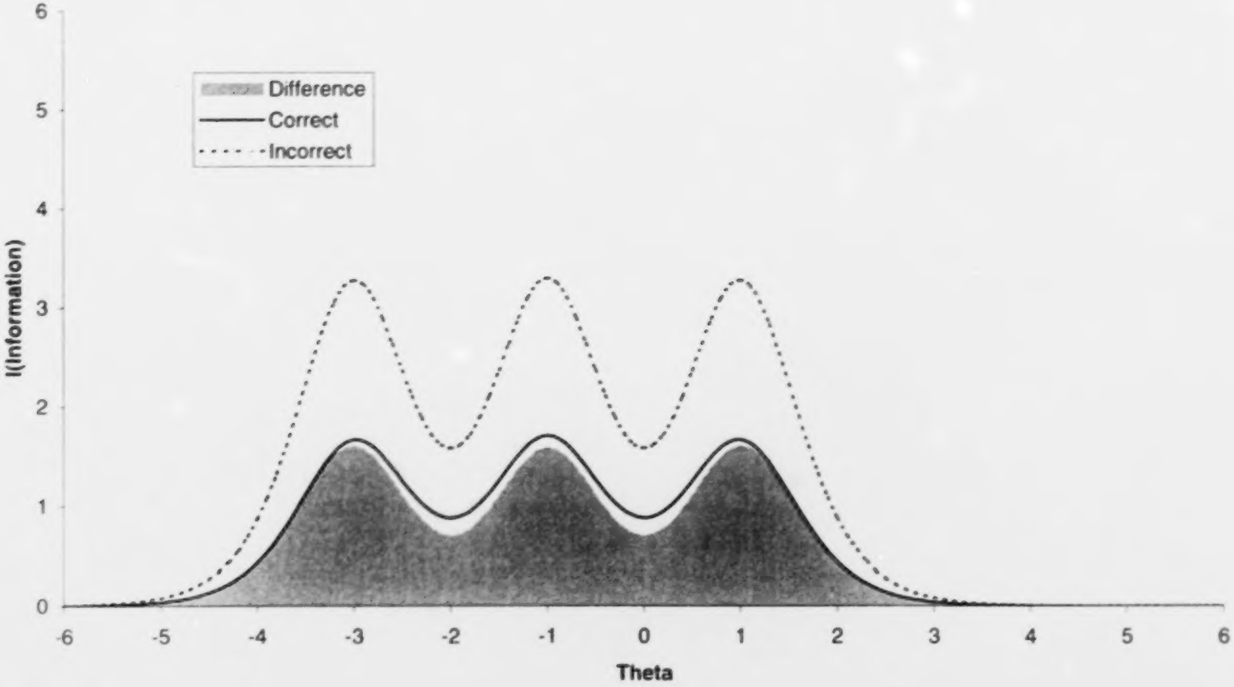


Figure H-6

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=1, d0=0, d1=2, d2=0, d3=-2, in Case of Four Response Categories

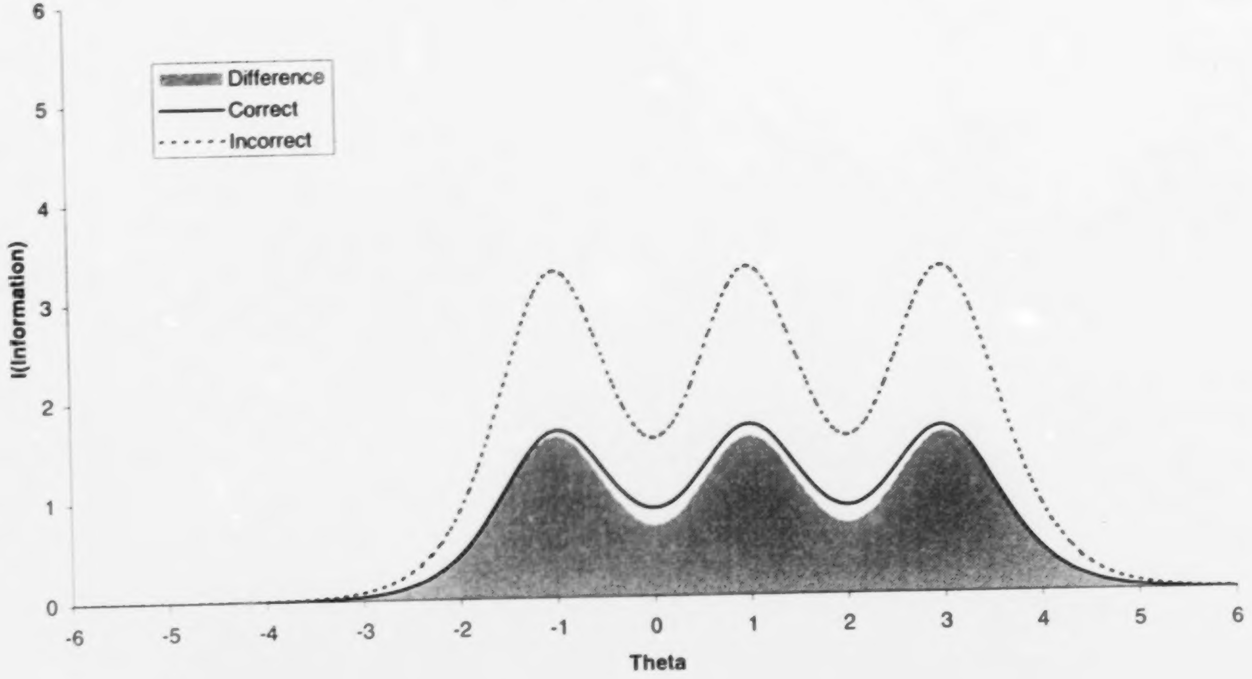


Figure H-7

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=1, d2=0, d3=-1, in Case of Four Response Categories

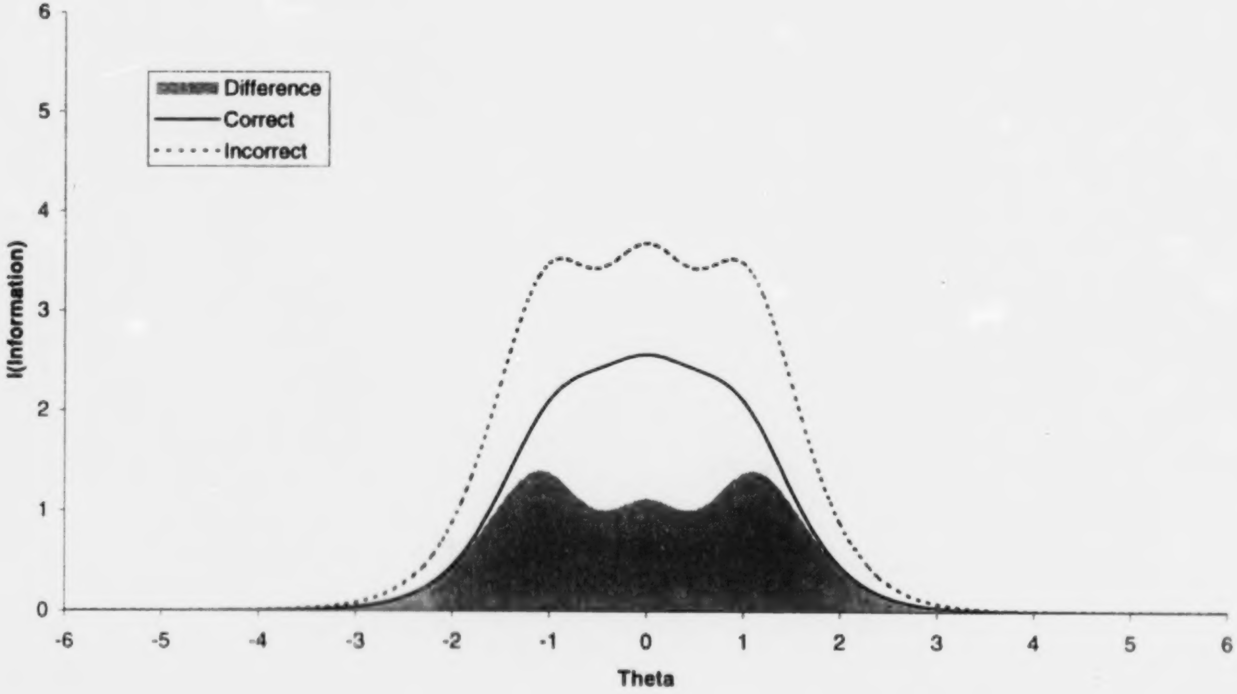
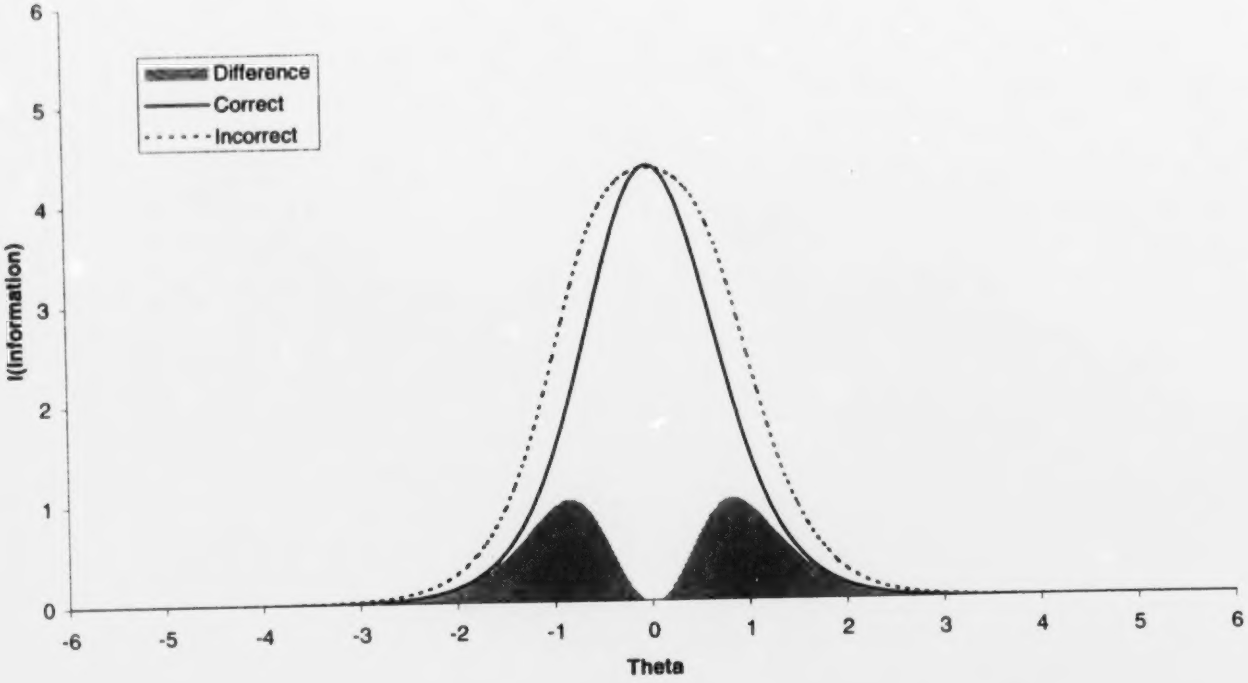


Figure H-8

Comparison Between the Incorrect and Correct Information Functions Using Hypothetical Item Parameters a=1.5, b=0, d0=0, d1=0.52, d2=0, d3=-0.52, in Case of Four Response Categories



Appendix I

CONSTRUCTED-RESPONSE ITEM SCORE STATISTICS

This appendix contains information about the constructed-response items included in the scaling of data from the 1996 main assessments of mathematics and science and the long-term trend assessments of reading, writing, and mathematics. There were no constructed-response items included in the scaling for the 1996 long-term trend assessment of science.

The information in the tables includes, for each subject area and grade (in the case of long-term trend, each age class), the NAEP item numbers for each of the constructed-response items included in scaling, and the block that contains the item. The tables also indicate the codes from the NAEP database that denote the range of responses and the correct responses where appropriate. A portion of the responses to the constructed-response items were scored twice for the purpose of examining rater reliability. For each item, the number of papers with responses that were scored a second time is listed, along with the percent agreement between raters and an index of reliability based on those responses. Cohen's Kappa (Cohen, 1968) is the reliability estimate used for dichotomized items. For items that are not dichotomized (i.e., polytomous items), the intraclass correlation coefficient is used as the index of reliability. See Chapter 9 for more information about score reliability for constructed-response items.

Table I-1

Score Range, Percent Agreement, and Cohen's Kappa[1]
for the Dichotomously Scored Constructed-Response Mathematics Items
Used in Main Assessment Scaling, Grade 4[2]

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
M019701	MF	1-2	2-	1962	98	0.967
M019801	MF	1-3	2-3	1956	94	0.877
M019901	MF	1-3	2-3	1953	98	0.963
M020001	MF	1-2	2-	1952	99	0.989
M020101	MF	1-2	2-	1946	99	0.980
M020201	MF	1-2	2-	1947	95	0.917
M020301	MF	1-4	4-	1948	100	0.993
M020401	MF	1-2	2-	1926	99	0.985
M020501	MF	1-2	2-	1850	99	0.980
M020701	MF	1-4	4-	1672	90	0.758
M039201	MC	1-2	2-	1986	99	0.985
M039301	MC	1-3	3-	1977	100	0.997
M040001	MC	1-3	3-	6546[3]	99	0.980
M040201	MC	1-2	2-	1660	95	0.800
M040301	MI	1-2	2-	1961	98	0.970
M040901	MI	1-2	2-	1955	100	1.000
M043201	MM	1-2	2-	1961	98	0.961
M043301	MM	1-3	3-	1967	99	0.980
M043401	MM	1-4	4-	1938	98	0.964
M043402	MM	1-4	4-	1914	99	0.978
M043403	MM	1-3	3-	1896	100	0.978
M046001	MK	1-5	5-	1973	100	0.991
M046601	MK	1-4	4-	1969	98	0.970
M046801	MK	1-5	5-	1967	99	0.986
M046901	MK	1-5	5-	1952	100	0.999
M047301	MK	1-4	4-	1876	100	0.992
M061901	MJ	1-3	3-	1987	97	0.941
M061902	MJ	1-3	2-3	1971	98	0.966
M061903	MJ	1-2	2-	1960	99	0.974
M061904	MJ	1-3	2-3	1945	99	0.962
M061905	MJ	1-4	4-	1863	97	0.937
M061906	MJ	1-3	3-	1758	98	0.845
M074301	MO	1-2	2-	1973	100	0.992
N277903	MF	1-2	2-	1800	100	0.986

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated by key) and wrong.

[2] Rescored responses from the national and state assessment samples contributed to these statistics.

[3] M040001 was erroneously identified as appearing only in the national assessment; therefore, the item was rescored at a higher rate.

Table I-2

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Mathematics Items Used in Main Assessment Scaling, Grade 4[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
M041201	MI	1-5	1934	84	0.918
M043501	MM	1-5	1882	91	0.962
M066301	ME	1-3	1971	98	0.971
M066501	ME	1-3	1949	98	0.988
M066601	ME	1-3	1932	92	0.935
M066701	ME	1-3	1883	96	0.973
M066801	ME	1-3	1750	96	0.965
M066901	ME	1-5	1756	92	0.979
M067901	MG	1-3	1952	98	0.987
M068001	MG	1-3	1944	99	0.989
M068002	MG	1-3	1902	98	0.983
M068003	MG	1-3	1679	98	0.978
M068004	MG	1-5	1692	94	0.984
M068701	ML	1-3	1968	99	0.985
M068901	ML	1-3	1815	98	0.979
M069001	ML	1-3	1724	91	0.915
M069101	ML	1-5	1686	94	0.970
M072201	MN	1-3	1952	99	0.995
M072202	MN	1-3	1947	97	0.980
M072401	MN	1-3	1848	94	0.964
M072501	MN	1-3	1636	93	0.929
M072601	MN	1-3	1360	98	0.969
M072701	MN	1-5	1337	94	0.973
M074501	MO	1-3	1969	92	0.932
M074701	MO	1-3	1954	98	0.981
M074801	MO	1-3	1930	99	0.988
M074901	MO	1-3	1886	95	0.967
M075001	MO	1-3	1770	99	0.985
M075101	MO	1-5	1766	90	0.964

[1] Rescored responses from the national and state assessment samples contributed to these statistics.

Table I-3

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Mathematics Items Used in Main Assessment Scaling, Grade 8*[2]

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
M019701	MF	1-2	2-	1742	100	0.987
M019801	MF	1-3	2-3	1786	98	0.953
M019901	MF	1-3	2-3	1781	99	0.983
M020001	MF	1-2	2-	1787	100	0.995
M020101	MF	1-2	2-	1784	100	0.990
M020201	MF	1-2	2-	1785	97	0.883
M020301	MF	1-4	4-	1784	100	0.998
M020401	MF	1-2	2-	1774	99	0.989
M020501	MF	1-2	2-	1774	100	0.991
M020801	MF	1-6	6-	1745	99	0.976
M020901	MF	1-2	2-	2188	94	0.897
M021001	MF	1-2	2-	1773	100	0.994
M021101	MF	1-3	3-	1741	96	0.920
M021201	MF	1-3	3-	1691	98	0.968
M021301	MF	1-2	2-	1704	98	0.968
M021302	MF	1-2	2-	1632	98	0.951
M046001	MK	1-5	5-	1785	100	0.983
M046601	MK	1-4	4-	1783	98	0.957
M046801	MK	1-5	5-	1784	100	0.988
M046901	MK	1-5	5-	1780	100	0.988
M047301	MK	1-4	4-	1775	100	0.982
M047901	MK	1-3	3-	1669	100	0.991
M050801	MC	1-2	2-	1773	100	0.995
M050901	MC	1-4	4-	1755	100	0.993
M051001	MC	1-2	2-	1708	96	0.939
M051201	MM	1-2	2-	1789	100	0.992
M051301	MM	1-2	2-	1778	100	0.986
M051601	MM	1-2	2-	1781	99	0.974
M052101	MM	1-3	3-	1758	97	0.944
M052401	MI	1-2	2-	1788	96	0.929
M052901	MI	1-2	2-	1766	95	0.898
M053001	MI	1-2	2-	1699	94	0.897
M061901	MJ	1-3	3-	1796	97	0.916
M061902	MJ	1-3	2-3	1788	99	0.952
M061903	MJ	1-2	2-	1804	99	0.925
M061904	MJ	1-3	2-3	1794	99	0.982

(continued)

Table I-3 (continued)

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Mathematics Items Used in Main Assessment Scaling, Grade 8*[2]

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
M061905	MJ	1-4	4-	1602	95	0.896
M061907	MJ	1-3	3-	1793	96	0.906
M061908	MJ	1-3	3-	1720	98	0.904

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated as key) and wrong.

[2] Rescored responses from the national and state assessment samples contributed to these statistics.

Table I-4

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Mathematics Items Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
M051101	MC	1-5	1718	85	0.903
M052201	MM	1-5	1759	93	0.968
M053101	MI	1-5	1698	90	0.937
M066301	ME	1-3	1789	99	0.972
M066501	ME	1-3	2349	96	0.976
M066601	ME	1-3	1770	94	0.958
M067201	ME	1-3	1762	91	0.944
M067501	ME	1-5	1750	94	0.942
M067901	MG	1-3	1785	98	0.991
M068003	MG	1-3	1779	99	0.988
M068005	MG	1-3	1785	98	0.981
M068006	MG	1-3	1741	94	0.950
M068008	MG	1-3	1462	92	0.898
M068201	MG	1-5	1001	88	0.939
M069301	ML	1-3	1818	99	0.992
M069601	ML	1-3	1794	95	0.940
M069701	ML	1-3	1769	100	0.997
M069901	ML	1-3	1514	95	0.953

(continued)

Table I-4 (continued)

Score Range, Percent Agreement, and Intraclass Correlation
for the Polytomously Scored Constructed-Response Mathematics Items
Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
M070001	ML	1-4	1528	90	0.955
M072901	MN	1-3	1789	93	0.951
M073401	MN	1-3	1752	97	0.963
M073501	MN	1-3	1622	98	0.978
M073601	MN	1-5	1247	87	0.948
M075301	MO	1-3	1774	98	0.980
M075401	MO	1-3	1774	94	0.942
M075601	MO	1-3	1837	95	0.953
M075801	MO	1-3	1671	90	0.939
M076001	MO	1-5	1506	91	0.947

[1] Rescored responses from the national and state assessment samples contributed to these statistics.

Table I-5

Score Range, Percent Agreement, and Cohen's Kappa[1]
for the Dichotomously Scored Constructed-Response Mathematics Items
Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
M019701	MF	1-2	2-	163	99	0.978
M019801	MF	1-3	2-3	168	98	0.957
M019901	MF	1-3	2-3	166	99	0.980
M020001	MF	1-2	2-	167	100	1.000
M020101	MF	1-2	2-	167	99	0.973
M020201	MF	1-2	2-	168	96	0.890
M020301	MF	1-4	4-	170	100	1.000
M020401	MF	1-2	2-	167	100	1.000
M020501	MF	1-2	2-	161	99	0.988
M020801	MF	1-6	6-	165	99	0.986
M020901	MF	1-2	2-	198	93	0.888
M021001	MF	1-2	2-	160	99	0.989
M021101	MF	1-3	3-	154	97	0.940
M021201	MF	1-3	3-	158	98	0.964
M021301	MF	1-2	2-	155	97	0.949
M021302	MF	1-2	2-	143	99	0.984

(continued)

Table I-5 (continued)

Score Range, Percent Agreement, and Cohen's Kappa[1]
for the Dichotomously Scored Constructed-Response Mathematics Items
Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
M046001	MK	1-5	5-	168	99	0.979
M046601	MK	1-4	4-	165	96	0.906
M046801	MK	1-5	5-	165	100	1.000
M046901	MK	1-5	5-	165	100	1.000
M047301	MK	1-4	4-	163	99	0.969
M047901	MK	1-3	3-	147	99	0.976
M050801	MC	1-2	2-	160	100	1.000
M050901	MC	1-4	4-	156	100	1.000
M051001	MC	1-2	2-	154	82	0.671
M051201	MM	1-2	2-	163	100	1.000
M051301	MM	1-2	2-	163	99	0.967
M051601	MM	1-2	2-	159	99	0.971
M052101	MM	1-3	3-	159	98	0.964
M052401	MI	1-2	2-	164	98	0.959
M052901	MI	1-2	2-	157	94	0.892
M053001	MI	1-2	2-	149	97	0.942
M061901	MJ	1-3	3-	185	98	0.954
M061902	MJ	1-3	2-3	179	98	0.932
M061903	MJ	1-2	2-	181	98	0.920
M061904	MJ	1-3	2-3	183	99	0.990
M061905	MJ	1-4	4-	153	92	0.841
M061907	MJ	1-3	3-	171	97	0.935
M061908	MJ	1-3	3-	175	99	0.958

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[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated as key) and wrong.

Table I-6

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Mathematics Items Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
M051101	MC	1-5	152	80	0.886
M052201	MM	1-5	162	95	0.983
M053101	MI	1-5	149	89	0.913
M066301	ME	1-3	158	99	0.995
M066501	ME	1-3	728	96	0.967
M066601	ME	1-3	154	97	0.979
M067201	ME	1-3	159	90	0.946
M067501	ME	1-5	160	92	0.938
M067901	MG	1-3	170	99	0.995
M068003	MG	1-3	163	99	0.989
M068005	MG	1-3	160	98	0.990
M068006	MG	1-3	156	92	0.933
M068008	MG	1-3	128	93	0.890
M068201	MG	1-5	85	88	0.943
M069301	ML	1-3	185	99	0.993
M069601	ML	1-3	180	93	0.908
M069701	ML	1-3	176	99	0.997
M069901	ML	1-3	148	95	0.954
M070001	ML	1-4	147	90	0.967
M072901	MN	1-3	161	94	0.955
M073401	MN	1-3	159	96	0.955
M073501	MN	1-3	147	100	1.000
M073601	MN	1-5	110	89	0.963
M075301	MO	1-3	165	100	1.000
M075401	MO	1-3	161	96	0.966
M075601	MO	1-3	166	94	0.949
M075801	MO	1-3	151	93	0.959
M076001	MO	1-5	128	91	0.958

Table I-7

Score Range, Percent Agreement, and Cohen's Kappa[1]
for the Dichotomously Scored Constructed-Response Science Items
Used in Main Assessment Scaling, Grade 4

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
K031004	SC	1-2	2-	678	95	0.872
K031101	SD	1-2	2-	675	97	0.914
K031102	SD	1-2	2-	671	95	0.887
K031103	SD	1-2	2-	658	95	0.896
K031104	SD	1-2	2-	652	98	0.930
K031508	SH	1-2	2-	415	95	0.862
K033001	SK	1-2	2-	469	95	0.865

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated by key) and wrong. These items are dichotomized into right (as indicated by key) and wrong.

Table I-8

Score Range, Percent Agreement, and Intraclass Correlation
for the Polytomously Scored Constructed-Response Science Items
Used in Main Assessment Scaling, Grade 4

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K031001	SC	1-3	759	96	0.927
K031002	SC	1-3	748	88	0.872
K031003	SC	1-3	732	91	0.837
K031005	SC	1-3	655	87	0.846
K031006	SC	1-3	579	93	0.951
K031007	SC	1-3	499	84	0.870
K031105	SD	1-3	633	99	0.978
K031107	SD	1-4	543	91	0.949
K031201	SE	1-3	700	99	0.988
K031202	SE	1-3	698	94	0.869
K031203	SE	1-4	687	96	0.990
K031204	SE	1-5	687	89	0.936
K031210	SE	1-3	481	87	0.886
K031211	SE	1-3	382	88	0.854
K031301	SF	1-4	656	94	0.963
K031302	SF	1-3	552	94	0.854
K031303	SF	1-3	488	93	0.926

(continued)

Table I-8 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 4

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K031304	SF	1-3	438	94	0.940
K031309	SF	1-4	617	93	0.957
K031401	SG	1-4	604	88	0.902
K031402	SG	1-3	611	93	0.955
K031403	SG	1-3	604	94	0.934
K031404	SG	1-3	598	95	0.976
K031407	SG	1-3	580	91	0.870
K031408	SG	1-3	561	98	0.989
K031409	SG	1-3	550	95	0.948
K031410	SG	1-3	536	96	0.945
K031501	SH	1-3	631	98	0.984
K031502	SH	1-3	622	94	0.880
K031503	SH	1-3	635	94	0.949
K031505	SH	1-3	622	96	0.970
K031506	SH	1-5	610	88	0.938
K031507	SH	1-3	482	94	0.915
K031509	SH	1-3	633	94	0.944
K031602	SI	1-3	603	98	0.987
K031603	SI	1-3	593	98	0.984
K031604	SI	1-3	594	99	0.991
K031606	SI	1-3	584	96	0.940
K031607	SI	1-4	565	93	0.960
K031608	SI	1-3	518	93	0.895
K031609	SI	1-3	480	96	0.920
K031901	SJ	1-3	463	89	0.929
K032001	SJ	1-3	464	97	0.981
K032501	SJ	1-3	448	95	0.962
K032502	SJ	1-3	440	96	0.969
K032601	SJ	1-3	422	89	0.866
K032602	SJ	1-3	390	91	0.915
K033101	SK	1-3	469	93	0.832
K033501	SK	1-3	448	93	0.894
K033502	SK	1-3	422	90	0.920
K033503	SK	1-3	398	89	0.877
K034001	SL	1-3	459	91	0.847
K034101	SL	1-3	466	89	0.906
KW34101	SL	1-3	464	89	0.936
KX34101	SL	1-3	460	95	0.942
KZ34101	SL	1-3	456	86	0.868

(continued)

Table I-8 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 4

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K034802	SM	1-3	509	94	0.927
K034901	SM	1-3	503	96	0.932
K034902	SM	1-3	508	95	0.933
K035201	SM	1-3	477	92	0.939
K035301	SM	1-4	455	94	0.940
K035601	SN	1-3	612	95	0.936
K035801	SN	1-3	626	93	0.954
K035901	SN	1-3	605	97	0.936
K036101	SN	1-3	586	94	0.952
K036301	SN	1-3	474	97	0.961
K037301	SO	1-3	452	97	0.937
K037401	SO	1-3	437	95	0.922
K037501	SO	1-3	441	97	0.884
K037601	SO	1-3	433	93	0.909
K037701	SO	1-4	419	97	0.982
K037702	SO	1-3	359	93	0.915
K038801	ST	1-4	510	97	0.967
K038901	ST	1-4	509	91	0.923
K039201	ST	1-3	464	96	0.937
K039301	ST	1-3	452	94	0.955
K039401	ST	1-4	433	94	0.916
K039801	SU	1-3	454	96	0.961
K039901	SU	1-5	460	91	0.963
K040001	SU	1-3	440	90	0.935
K040301	SU	1-3	382	89	0.879
K040401	SU	1-4	342	95	0.950
K040501	SU	1-3	281	97	0.977

Table I-9

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 8*[2]

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
K038101	SO	1-2	2-	1230	98	0.928
K040806	SE	1-2	2-	792	91	0.750
K040904	SG	1-2	2-	1669	98	0.956
K041101	SG	1-2	2-	1654	98	0.959
K042603	SJ	1-2	2-	1158	95	0.850
K048103	SL	1-2	2-	1077	94	0.869

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated by key) and wrong.

[2] Rescored responses from the national and state assessment samples contributed to these statistics.

Table I-10

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K031301	SF	1-4	1901	98	0.918
K031302	SF	1-3	1876	89	0.797
K031305	SF	1-3	1828	94	0.877
K031306	SF	1-3	1809	98	0.867
K031307	SF	1-3	1693	94	0.938
K031308	SF	1-3	1496	97	0.921
K031309	SF	1-4	1898	97	0.925
K031602	SI	1-3	1684	98	0.983
K031603	SI	1-3	1676	99	0.961
K031604	SI	1-3	1680	100	0.994
K031606	SI	1-3	1676	95	0.945
K031607	SI	1-4	1675	90	0.927
K031608	SI	1-3	1668	92	0.891
K031609	SI	1-3	1667	96	0.958
K031610	SI	1-3	1675	98	0.979
K031611	SI	1-3	1658	97	0.951
K031613	SI	1-3	1602	99	0.961

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Table I-10 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K035601	SN	1-3	1685	93	0.936
K035801	SN	1-3	1688	94	0.955
K035901	SN	1-3	1683	95	0.961
K036101	SN	1-3	1683	94	0.942
K036301	SN	1-3	1677	95	0.974
K036401	SN	1-3	1670	97	0.955
K036402	SN	1-3	1672	93	0.930
K036403	SN	1-3	1669	92	0.876
K036404	SN	1-3	1666	92	0.796
K036701	SN	1-3	1671	97	0.954
K036801	SN	1-3	1656	97	0.965
K037301	SO	1-3	1271	93	0.947
K037401	SO	1-3	1271	93	0.938
K037501	SO	1-3	1263	96	0.916
K037601	SO	1-3	1269	89	0.926
K037701	SO	1-4	1269	99	0.985
K037703	SO	1-3	1266	91	0.900
K038201	SO	1-3	1225	92	0.849
K038301	SO	1-5	1132	85	0.899
K040601	SC	1-3	2051	99	0.988
K040603	SC	1-3	1832	95	0.956
K040604	SC	1-3	1778	93	0.916
K040605	SC	1-3	1665	95	0.970
K040606	SC	1-4	1544	94	0.959
K040607	SC	1-4	2027	94	0.974
K040608	SC	1-4	2005	91	0.959
K040609	SC	1-4	1978	95	0.980
K040610	SC	1-4	1949	93	0.967
K040701	SD	1-4	1892	93	0.942
K040702	SD	1-4	1889	94	0.955
K040704	SD	1-3	1883	95	0.958
K040705	SD	1-3	1872	93	0.864
K040708	SD	1-3	1855	92	0.911
K040711	SD	1-3	1768	92	0.955
K040713	SD	1-4	1561	84	0.898
K040802	SE	1-3	1775	98	0.980
K040803	SE	1-3	1522	96	0.928
K040804	SE	1-3	1117	94	0.903

(continued)

Table I-10 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K040805	SE	1-3	1030	95	0.922
K040808	SE	1-3	1673	98	0.989
K040901	SG	1-3	1670	96	0.981
K040902	SG	1-3	1672	93	0.946
K040903	SG	1-3	1669	91	0.938
K040905	SG	1-3	1668	92	0.915
K041002	SG	1-3	1665	86	0.910
K041004	SG	1-3	1654	96	0.983
K041201	SG	1-3	1650	91	0.911
K041202	SG	1-3	1508	90	0.811
K041306	SH	1-3	1678	87	0.903
K041307	SH	1-3	1685	91	0.894
K041401	SH	1-3	1668	96	0.958
K041402	SH	1-3	1661	99	0.988
K041403	SH	1-3	1643	94	0.890
K041901	SJ	1-3	1254	95	0.927
K042001	SJ	1-3	1259	91	0.888
K042101	SJ	1-3	1256	98	0.959
K042102	SJ	1-3	1258	97	0.974
K042201	SJ	1-3	1259	97	0.915
K042601	SJ	1-3	1215	89	0.875
K042602	SJ	1-4	1190	94	0.956
K043001	SK	1-3	1259	95	0.919
K043101	SK	1-3	1260	89	0.888
K043102	SK	1-4	1261	85	0.934
K043103	SK	1-3	1254	92	0.818
K043501	SK	1-3	1246	94	0.936
K043601	SK	1-3	1178	89	0.881
K043602	SK	1-3	1119	95	0.877
K043603	SK	1-3	1110	95	0.916
K044101	ST	1-3	1268	98	0.974
K044201	ST	1-3	1270	89	0.904
K044301	ST	1-3	1270	95	0.965
K044401	ST	1-3	1268	85	0.860
K044901	ST	1-3	1256	93	0.916
K045001	ST	1-3	1237	90	0.898
K045101	ST	1-4	1155	88	0.928
K045102	ST	1-4	1092	89	0.907

(continued)

Table I-10 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 8[1]

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K045301	SU	1-3	1252	93	0.951
K045601	SU	1-4	1257	96	0.954
K045701	SU	1-3	1259	90	0.921
K045801	SU	1-3	1251	94	0.933
K046301	SU	1-3	1246	93	0.879
K046401	SU	1-3	1218	94	0.905
K046501	SU	1-3	1215	95	0.954
K046601	SU	1-3	1192	91	0.942
K046701	SU	1-4	1137	88	0.873
K047201	SL	1-4	1260	88	0.948
K047301	SL	1-3	1262	96	0.969
K047401	SL	1-3	1254	92	0.942
K047901	SL	1-3	1237	92	0.952
K048001	SL	1-3	1209	99	0.986
K048101	SL	1-4	1156	90	0.896
K048102	SL	1-3	1093	95	0.866
K048601	SM	1-3	1272	93	0.931
K048901	SM	1-3	1278	98	0.985
K049001	SM	1-3	1278	100	0.981
K049301	SM	1-3	1254	98	0.941
K049401	SM	1-3	1234	94	0.928
K049402	SM	1-3	1236	89	0.919
K049403	SM	1-3	1190	88	0.875
K049404	SM	1-4	1156	84	0.833

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[1] Rescored responses from the national and state assessment samples contributed to these statistics.

Table I-11

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 12*

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
K040806	SE	1-2	2-	401	86	0.705
K048103	SL	1-2	2-	361	94	0.884
K049708	SF	1-2	2-	690	98	0.951
K051002	SJ	1-2	2-	450	92	0.854
K051003	SJ	1-2	2-	448	96	0.911
K051004	SJ	1-2	2-	444	96	0.915
K051701	SK	1-2	2-	455	96	0.918
K054004	SO	1-2	2-	431	97	0.902

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated by key) and wrong.

Table I-12

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K040802	SE	1-3	660	99	0.987
K040803	SE	1-3	603	97	0.946
K040804	SE	1-3	502	93	0.953
K040805	SE	1-3	471	96	0.959
K040808	SE	1-3	641	98	0.991
K041306	SH	1-3	628	88	0.906
K041307	SH	1-3	624	91	0.921
K041401	SH	1-3	630	93	0.924
K041402	SH	1-3	626	99	0.990
K041403	SH	1-3	614	94	0.897
K041404	SH	1-3	608	95	0.963
K041406	SH	1-3	569	96	0.898
K047201	SL	1-4	459	90	0.959
K047301	SL	1-3	458	96	0.971
K047401	SL	1-3	458	92	0.954
K047901	SL	1-3	447	94	0.962
K048001	SL	1-3	437	98	0.972

(continued)

Table I-12 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K048101	SL	1-4	404	84	0.861
K048102	SL	1-3	364	93	0.850
K048601	SM	1-3	476	92	0.937
K048901	SM	1-3	476	98	0.985
K049001	SM	1-3	476	99	0.940
K049301	SM	1-3	475	96	0.921
K049401	SM	1-3	463	94	0.938
K049402	SM	1-3	457	86	0.894
K049403	SM	1-3	432	87	0.871
K049404	SM	1-4	418	81	0.827
K049501	SC	1-4	752	98	0.970
K049502	SC	1-5	743	92	0.930
K049503	SC	1-3	721	94	0.954
K049504	SC	1-3	699	93	0.946
K049505	SC	1-3	667	93	0.945
K049506	SC	1-4	597	96	0.917
K049601	SD	1-4	701	88	0.894
K049602	SD	1-5	697	96	0.983
K049603	SD	1-5	643	82	0.883
K049604	SD	1-3	510	94	0.949
K049701	SF	1-3	692	99	0.968
K049702	SF	1-3	692	98	0.973
K049703	SF	1-3	681	93	0.940
K049704	SF	1-3	670	95	0.951
K049705	SF	1-4	615	88	0.954
K049706	SF	1-3	586	83	0.874
K049707	SF	1-5	509	84	0.938
K049802	SG	1-3	608	95	0.971
K049804	SG	1-3	609	95	0.954
K049807	SG	1-4	610	90	0.941
K049809	SG	1-3	599	88	0.880
K049810	SG	1-4	592	90	0.960
K049812	SG	1-3	588	95	0.940
K049813	SG	1-3	564	92	0.929
K049814	SG	1-3	550	94	0.932
K049815	SG	1-4	472	91	0.921
K049901	SI	1-3	604	94	0.963
K049902	SI	1-3	601	87	0.910
K049903	SI	1-3	599	90	0.931
K049904	SI	1-3	600	93	0.941

(continued)

Table I-12 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K049907	SI	1-3	593	85	0.916
K049908	SI	1-3	585	97	0.980
K049909	SI	1-4	584	94	0.952
K049911	SI	1-3	560	94	0.955
K049912	SI	1-5	534	81	0.906
K049914	SI	1-3	544	93	0.931
K050401	SJ	1-3	457	93	0.898
K050501	SJ	1-4	453	91	0.962
K050901	SJ	1-3	454	98	0.984
K051001	SJ	1-3	453	93	0.976
K051101	SJ	1-3	434	96	0.948
K051102	SJ	1-3	417	93	0.852
K051201	SJ	1-3	380	92	0.878
K051801	SK	1-3	453	91	0.927
K052301	SK	1-3	448	98	0.983
K052401	SK	1-4	450	90	0.959
K052402	SK	1-3	441	97	0.975
K052501	SK	1-4	441	90	0.959
K052502	SK	1-4	435	91	0.926
K052503	SK	1-3	422	94	0.885
K052901	SN	1-4	641	89	0.952
K053001	SN	1-3	638	92	0.914
K053101	SN	1-3	641	99	0.993
K053102	SN	1-3	636	92	0.944
K053601	SN	1-5	621	91	0.944
K053701	SN	1-3	594	95	0.952
K053801	SN	1-3	582	90	0.900
K053901	SN	1-3	540	94	0.895
K054001	SO	1-4	447	98	0.977
K054002	SO	1-3	444	93	0.915
K054003	SO	1-3	436	99	0.985
K054005	SO	1-3	422	96	0.953
K054006	SO	1-3	416	97	0.969
K054007	SO	1-3	396	85	0.793
K054008	SO	1-4	342	79	0.831

(continued)

Table I-12 (continued)

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Science Items Used in Main Assessment Scaling, Grade 12

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
K057401	ST	1-3	465	92	0.943
K057501	ST	1-3	468	91	0.909
K057601	ST	1-3	469	97	0.970
K057701	ST	1-3	470	98	0.973
K058001	ST	1-3	469	95	0.896
K058201	ST	1-4	446	88	0.925
K058301	ST	1-4	423	86	0.906
K058401	ST	1-3	394	93	0.963
K058501	ST	1-4	364	91	0.929
K059001	SU	1-3	475	89	0.873
K059101	SU	1-3	470	95	0.941
K059201	SU	1-4	474	93	0.974
K059301	SU	1-4	473	99	0.985
K059801	SU	1-3	448	91	0.920
K059901	SU	1-4	444	95	0.964
K060001	SU	1-3	433	92	0.954
K060101	SU	1-4	423	89	0.895
K089811	SG	1-3	587	92	0.911

Table I-13

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Reading Items Used in Long-Term Trend Assessment Scaling, Age Class 9

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N001507	BH	1-6	252	92	0.947
N002804	BL	1-5	184	95	0.958
N003104	BM	1-5	177	87	0.879
N003704	BN	1-4	192	92	0.902
N008905	BJ	1-6	235	94	0.972

Table I-14

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Reading Items Used in Long-Term Trend Assessment Scaling, Age Class 13

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N001507	BH	1-6	285	89	0.901
N001904	BJ	1-5	256	87	0.914
N002302	BK	1-9	0	0	0.000
N002804	BL	1-5	309	90	0.911
N003104	BM	1-5	272	90	0.909
N003704	BN	1-4	236	89	0.889
N004303	BO	1-4	259	91	0.908
N004605	BP	1-5	277	94	0.969

Table I-15

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Reading Items Used in Long-Term Trend Assessment Scaling, Age Class 17

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N001507	BH	1-6	244	90	0.929
N001904	BJ	1-5	261	91	0.931
N002302	BK	1-9	0	0	0.000
N002804	BL	1-5	262	90	0.911
N003104	BM	1-5	239	89	0.908
N003704	BN	1-4	219	89	0.908
N004303	BO	1-4	180	83	0.879
N004605	BP	1-5	230	95	0.967
N015905	BQ	1-4	201	89	0.932

Table I-16

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Mathematics Items Used in Long-Term Trend Assessment Scaling, Age Class 9*

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
N270001	M1	1-2	1-	618	99	0.972
N270901	M1	1-2	1-	618	100	0.973
N271101	M2	1-2	1-	614	98	0.955
N275401	M2	1-2	1-	614	98	0.951
N276001	M2	1-2	1-	614	99	0.976
N276002	M2	1-2	1-	614	98	0.963
N276021	M3	1-2	1-	575	99	0.979
N276022	M3	1-2	1-	575	99	0.979
N276101	M1	1-2	1-	618	100	0.992
N276801	M1	1-2	1-	618	100	0.961
N276802	M1	1-2	1-	618	100	0.979
N276803	M1	1-2	1-	618	98	0.963
N276821	M3	1-2	1-	575	100	0.978
N276822	M3	1-2	1-	575	99	0.962
N276823	M3	1-2	1-	575	99	0.981
N277501	M2	1-2	1-	614	99	0.967
N277601	M2	1-4	1-	614	99	0.979
N277602	M2	1-5	1-	614	99	0.987
N277603	M2	1-2	1-	614	99	0.971
N277621	M3	1-2	1-	575	99	0.971
N277622	M3	1-2	1-	575	99	0.959
N277623	M3	1-2	1-	575	99	0.949
N284001	M1	1-2	1-	618	99	0.981
N284002	M1	1-2	1-	618	99	0.957
N284021	M3	1-2	1-	575	99	0.960
N284022	M3	1-2	1-	575	99	0.959
N286101	M1	1-2	1-	618	99	0.980
N286102	M2	1-2	1-	614	98	0.966

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[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated as key) and wrong.

Table I-17

Score Range, Percent Agreement, and Cohen's Kappa[1]
for the Dichotomously Scored Constructed-Response Mathematics Items
Used in Long-Term Trend Assessment Scaling, Age Class 13

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
N256101	M2	1-2	1-	621	99	0.974
N257601	M1	1-2	1-	643	99	0.976
N263101	M1	1-2	1-	643	99	0.975
N264521	M3	1-2	1-	624	98	0.968
N269201	M2	1-2	1-	621	96	0.857
N275001	M1	1-2	1-	643	99	0.981
N276801	M1	1-2	1-	643	100	0.946
N276802	M1	1-2	1-	643	100	0.928
N276803	M1	1-2	1-	643	98	0.951
N276821	M3	1-2	1-	624	100	1.000
N276822	M3	1-2	1-	624	100	0.901
N276823	M3	1-2	1-	624	100	0.979
N277601	M1	1-4	1-	643	99	0.935
N277602	M1	1-5	1-	643	99	0.981
N277603	M1	1-2	1-	643	99	0.964
N277901	M2	1-2	1-	621	100	0.950
N277902	M2	1-2	1-	621	100	0.907
N277903	M2	1-2	2-	621	100	0.980
N280621	M3	1-2	1-	624	99	0.976
N280622	M3	1-2	1-	624	98	0.968
N280623	M3	1-2	1-	624	99	0.978
N280624	M3	1-2	1-	624	98	0.962
N280625	M3	1-2	1-	624	99	0.986
N280626	M3	1-2	1-	624	98	0.967
N286601	M2	1-2	1-	621	99	0.982
N286602	M2	1-3	1-	621	100	0.994
N286603	M2	1-2	1-	621	99	0.984

[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated as key) and wrong.

Table I-18

Score Range, Percent Agreement, and Cohen's Kappa[1] *for the Dichotomously Scored Constructed-Response Mathematics Items Used in Long-Term Trend Assessment Scaling, Age Class 17*

Item	Block	Range of Response Codes	Correct Response Codes	Sample Size	Percent Agreement	Cohen's Kappa
N251101	M1	1-2	1-	616	100	0.996
N255801	M2	1-2	1-	616	100	0.986
N256001	M3	1-2	1-	564	99	0.984
N256101	M1	1-2	1-	616	100	1.000
N259001	M2	1-2	1-	616	100	0.994
N260601	M1	1-2	1-	616	100	1.000
N260801	M2	1-2	1-	616	100	0.997
N263001	M1	1-2	1-	616	100	0.994
N263101	M2	1-2	1-	616	100	0.996
N264301	M1	1-2	1-	616	100	0.992
N264321	M3	1-2	1-	564	99	0.990
N264521	M3	1-2	1-	564	100	0.996
N267921	M3	1-2	1-	564	99	0.985
N276821	M3	1-2	1-	564	100	0.940
N276822	M3	1-2	1-	564	100	1.000
N276823	M3	1-2	1-	564	100	1.000
N278501	M1	1-2	1-	616	100	1.000
N278502	M1	1-2	1-	616	100	0.991
N278503	M1	1-2	1-	616	100	1.000
N280401	M2	1-2	1-	616	100	0.996
N280621	M3	1-2	1-	564	100	1.000
N280622	M3	1-2	1-	564	100	1.000
N280623	M3	1-2	1-	564	100	1.000
N280624	M3	1-2	1-	564	100	0.995
N280625	M3	1-2	1-	564	100	0.996
N280626	M3	1-2	1-	564	100	0.997
N285321	M3	1-2	1-	564	99	0.990
N287301	M1	1-2	1-	616	100	0.997
N287302	M1	1-2	1-	616	100	0.997

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[1] Cohen's Kappa is a measure of reliability that is appropriate for items that are dichotomized. These items are dichotomized into right (as indicated by key) and wrong.

Table I-19

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Writing Items Used in Long-Term Trend Assessment Scaling, Age Class 9

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N000602	BE	1-3	459	97	0.976
N000902	BG	1-4	522	96	0.967
N001002	BG	1-4	384	94	0.945
N007602	BG	1-4	263	93	0.920
N007608	BV	1-4	159	55	0.819
N014702	BC	1-6	511	96	0.962
N014802	BE	1-4	524	93	0.957
N014808	BE	1-6	366	60	0.863

Table I-20

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Writing Items Used in Long-Term Trend Assessment Scaling, Age Class 13

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N000302	BC	1-4	591	92	0.916
N000371	BC	1-6	336	59	0.846
N000402	BD	1-4	566	92	0.911
N000471	BD	1-6	329	53	0.813
N000502	BE	1-4	610	89	0.893
N000602	BE	1-3	591	97	0.958
N000902	BG	1-4	616	93	0.936
N001002	BG	1-4	547	94	0.930

Table I-21

Score Range, Percent Agreement, and Intraclass Correlation for the Polytomously Scored Constructed-Response Writing Items Used in Long-Term Trend Assessment Scaling, Age Class 17

Item	Block	Range of Response Codes	Sample Size	Percent Agreement	Intraclass Correlation
N000302	BC	1-4	501	92	0.925
N000371	BC	1-6	324	54	0.815
N000402	BD	1-4	477	92	0.915
N000471	BD	1-4	307	50	0.820
N001002	BG	1-4	473	93	0.931
N018002	BE	1-4	519	86	0.904
N019002	BE	1-4	489	93	0.937
N021002	BG	1-4	527	88	0.912

Appendix J

DIFFERENTIAL ITEM FUNCTIONING (DIF) RESULTS

Table J-1

1996 Mathematics Items Identified as "C" or "CC" Items in At Least One Comparison[1]

Item	Block	Scale	Category	Grade	Comparison	Group Favored
M077701	MQ7	Estimation	C	4	White/Black	White
M067501	ME11A	Data Analysis, Statistics, and Probability	CC	8	White/Black	White
M072901	MN2A	Data Analysis, Statistics, and Probability	CC	8	White/Hispanic	White
M075401	MO3A	Measurement	CC	8	White/Black	White
M075601	M05A	Measurement	CC	8	White/Black	White
M085010	MV10A	Theme: Measurement	CC	8	White/Hispanic	White
M070702	ME2A	Algebra and Functions	C	12	White/Black	Black
M070702	ME2A	Algebra and Functions	C	12	White/Hispanic	Hispanic
M071701	MG8A	Algebra and Functions	CC	12	White/Black	Black
M083701	MS2A	Advanced Data Analysis, Statistics, and Probability	C	12	Male/Female	Male

[1] For each grade for which an item was administered, three comparisons were performed: Male/Female, White/Black, and White/Hispanic.

Table J-2

1996 Science Items Identified as "C" or "CC" Items in At Least One Comparison[1]

Item	Block	Scale	Category	Grade	Comparison	Group Favored
K031202	SE2A	Earth Science	CC	4	Male/Female	Male
K031203	SE3A	Physical Science	CC	4	Male/Female	Female
K031204	SE4A	Physical Science	CC	4	Male/Female	Female
K031304	SF9A	Physical Science	CC	4	White/Black	White
K031403	SG3A	Earth Science	CC	4	White/Black	White
K032901	SK3	Physical Science	C	4	Male/Female	Male
K033502	SK10A	Life Science	CC	4	White/Black	Black
K033503	SK11A	Life Science	CC	4	White/Black	Black
K035801	SN5A	Physical Science	CC	4	Male/Female	Male
K036301	SN10A	Physical Science	CC	4	Male/Female	Male
K039101	ST8	Earth Science	C	4	Male/Female	Male
K039201	ST9A	Physical Science	CC	4	Male/Female	Male
K040001	SU6A	Physical Science	CC	4	Male/Female	Male
K040101	SU7	Physical Science	C	4	Male/Female	Male
K036101	SN7A	Earth Science	CC	8	Male/Female	Male
K036401	SN10A	Earth Science	CC	8	Male/Female	Male
K037501	SO6A	Physical Science	CC	8	Male/Female	Male

[1] For each grade for which an item was administered, three comparisons were performed: Male/Female, White/Black, and White/Hispanic.

(continued)

Table J-2 (continued)

1996 Science Items Identified as "C" or "CC" Items in At Least One Comparison[1]

Item	Block	Scale	Category	Grade	Comparison	Group Favored
K037601	SO7A	Earth Science	CC	8	White/Hispanic	White
K038201	SO15A	Earth Science	CC	8	White/Hispanic	Hispanic
K040608	SC2G	Physical Science	CC	8	White/Black	Black
K041202	SG12A	Earth Science	CC	8	Male/Female	Male
K041601	SJ2	Earth Science	C	8	Male/Female	Male
K042602	SJ15A	Life Science	CC	8	Male/Female	Female
K042701	SK1	Earth Science	C	8	Male/Female	Male
K043101	SK7A	Earth Science	CC	8	Male/Female	Male
K043301	SK11	Earth Science	C	8	Male/Female	Male
K044101	ST5A	Earth Science	CC	8	Male/Female	Male
K044901	ST13A	Life Science	CC	8	White/Black	Black
K045001	ST14A	Life Science	CC	8	White/Black	Black
K045001	ST14A	Life Science	CC	8	White/Hispanic	Hispanic
K046701	SU16A	Life Science	CC	8	White/Hispanic	White
K049401	SM13A	Earth Science	CC	8	White/Black	Black
K049401	SM13A	Earth Science	CC	8	Male/Female	Male
K040805	SE4A	Earth Science	CC	12	White/Hispanic	Hispanic
K048901	SM8A	Life Science	CC	12	Male/Female	Female
K048901	SM8A	Life Science	CC	12	White/Black	White
K048901	SM8A	Life Science	CC	12	White/Hispanic	White
K049301	SM12A	Life Science	CC	12	White/Hispanic	Hispanic
K049603	SD3A	Physical Science	CC	12	Male/Female	Female
K049702	SF2A	Physical Science	CC	12	White/Hispanic	Hispanic
K049802	SG2A	Earth Science	CC	12	White/Black	Black
K050501	SJ6A SK10	Earth Science	CC	12	White/Black	White
K052201	SS10	Life Science	C	12	Male/Female	Male
K052502	SK15A	Life Science	CC	12	White/Hispanic	Hispanic
K053601	SN13A SS5A	Life Science	CC	12	Male/Female	Female
K053701	SN14A	Life Science	CC	12	Male/Female	Male
K054005	SO5A	Life Science	CC	12	White/Black	Black
K058201	ST13A	Physical Science	CC	12	White/Hispanic	White
K058301	ST14A	Physical Science	CC	12	Male/Female	Male
K058401	ST15A	Earth Science	CC	12	Male/Female	Male
K059901	SU14A	Earth Science	CC	12	White/Black	White

[1] For each grade for which an item was administered, three comparisons were performed: Male/Female, White/Black, and White/Hispanic.

Appendix K

CORRECTION OF THE NAEP PROGRAM DOCUMENTATION ERROR IN THE 1992 STATE MATHEMATICS RESULTS

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In April 1995, results from the 1994 Trial State Assessment in reading were released as part of the report *1994 NAEP Reading: A First Look* (Williams, Reese, Campbell, Mazzeo, & Phillips, 1995). Subsequently, ETS/NAEP research scientists discovered an error in the documentation for the ETS version of the PARSCALE program, which is used to compute NAEP scale score results. The error affected how omitted responses were treated in the IRT scaling of the extended constructed-response items that received partial-credit scoring (i.e., could have several partially correct categories) in analyses of 1992 and 1994 assessment data. The error affected only polytomous items; omitted multiple-choice and omitted short constructed responses were treated appropriately.

The conventional treatment in NAEP subjects has been to treat omitted responses (blank responses to an item that are followed by valid responses to items that appear later in the test) as the lowest possible score category in the production of NAEP scale scores. In contrast, not-reached responses (blank responses that are not followed by any further student responses) are treated as missing data. As a result of the documentation error, for a number of the partial credit (or polytomous) constructed-response items and across several subject areas, *all* blank responses (both omitted and not-reached responses) to affected items were treated as missing—a *reasonable* model for treating omits but one that does *not* conform to the *conventional* practice in NAEP.

The error occurred because of a documentation error in the description of one of the PARSCALE control parameters, designated as POMIT. The program permits the analyst to choose two different ways of treating blank responses for partial credit items: (a) as missing data, and (b) as incorrect, i.e. a valid response falling in the lowest score category. The documentation indicates that by setting POMIT= −1, the treatment in (a) occurs. By setting POMIT=0 or POMIT=1, the treatment in (b) is supposed to occur. The POMIT=1 setting is the program default. In reality, POMIT=1 and POMIT= −1 operate equivalently, treating blank responses as missing data.

The error appears to have been introduced in 1992 when the programs BILOG and PARSCALE were merged to form the ETS version of PARSCALE. Verification of the accuracy of existing documentation, modifications to internal program diagnostics, and more systematic testing procedures for any and all changes to NAEP-related programs were implemented immediately to reduce the likelihood of experiencing this kind of error in subsequent NAEP cycles.

The PARSCALE documentation error affected a number of the NAEP scales constructed since 1992. Specifically, the 1992 national and state mathematics results were affected by the error. Results from these two assessments have been released to the public in a number of NAEP publications. The data has also been available to the public through NCES's secondary-use data files.

NCES and ETS felt that the most technically correct plan of action would be to recalculate all affected NAEP scales, no matter how slight the change, and to issue revised results. ETS was therefore instructed by NCES to recalculate all affected scales.

In recomputing the cutpoints for the achievement levels, an additional error (the information weighting error) was discovered in the procedures used by American College Testing (ACT) in 1992 to "map" the achievement-level cutpoints onto the NAEP scale. The procedures contained an incorrectly derived formula. Details can be found in Appendix I of the *Technical Report of the NAEP 1994 Trial State Assessment in Reading* (Mazzeo, Allen, & Kline, 1995). ACT used revised procedures with the correct formula to map the achievement-level cutpoints for the 1994 U.S. history and geography scales and the 1996 science scales. The error in the procedures affected achievement-level cutpoints for the 1990 mathematics national assessment at all grade levels (grades 4, 8, and 12) and the 1990 Trial State Assessment in mathematics, which was only at grade 8. This error also affected the 1992 mathematics results for the nation and the states. The information weighting error added a source of error to results in addition to the error associated problem with defining omits. Note that the proficiency estimates for 1990 mathematics are correct and did not have to be recalculated; only the cutpoints for the achievement levels were affected. For this reason, the achievement level almanac for 1990 state mathematics is not included in this appendix.

The information documenting the original analysis of the 1992 data that appears in the *Technical Report of the NAEP 1992 Trial State Assessment Program in Mathematics* (Johnson, Mazzeo, & Kline, 1993) is substantially in agreement with the revised 1994 analysis. The transformation constants for the revised analysis are provided in Table K-1. The information in the other sections of the technical report for the 1996 state mathematics assessment refer only to the revised analysis of the 1994 Trial State Assessment data.

Table K-1
Transformation Constants for the 1992 Trial State Assessment in Mathematics

	Grade 4		**Grade 8**	
Scale	**k_1**	**k_2**	**k_1**	**k_2**
Numbers and Operations	214.59	34.16	268.76	34.60
Measurement	221.40	33.28	262.82	43.95
Geometry	220.55	28.59	260.44	33.81
Data Analysis, Statistics, and Probability	217.80	32.66	264.58	39.93
Algebra and Functions	217.91	29.00	264.23	36.13
Estimation	205.41	35.52	267.14	28.14

As shown by Tables K-3 through K-5, all jurisdictions had average scores that were adjusted upward slightly as a result of the revision of results. For grade 4, Tables K-3 and K-4 indicate that average scores increased from .9 to 1.5 points on the proficiency scale. Accordingly, average scores in all the percentiles go up in a similar fashion. Since all jurisdictions were affected in a similar manner, there is little change in the ranking of the jurisdictions. With regard to achievement level results, Tables K-7 and K-8 indicate that although the average scale scores moved up when revised, the percent of students at or above the advanced, proficient and basic achievement levels went down slightly as a result of the two revisions. For the advanced level, percentages for the jurisdictions went down 0 to .8 percent, while for the below basic level, percentages went up .6 to 1.7 percent. Since the scale scores uniformly moved up, the shift in achievement level percentages must be due to the shift upward of the achievement level cutpoints as result of the information weighting error (see Table K-2). Similar results are evident for grade 8.

Tables K-5 and K-6 indicate that average scores for jurisdictions went up from .6 to 1 point as a result of the revision of scale scores, with similar slight upward adjustments occurring at every listed percentile. This change is somewhat less than what was demonstrated for grade 4 and again the ranking of the jurisdictions did not show much change. Tables K-9 and K-10 list the original and revised eighth-grade results for the achievement-level percentages. These tables also list values for 1990, since the Trial State Assessment was administered only at grade 8 and not grade 4 that year. The effects of the revision of the 1992 results are similar to those for grade 4. Although revised means were greater for every jurisdiction, the percentage above the three achievement levels were slightly smaller while percentages below the basic achievement level were slightly larger. As with grade 4, this reflects the upward shift of the achievement-level cutpoints as a result of the information weighting error (see Table K-2).

For grade 8, there is the question of the effect of the revisions on the 1990 to 1992 trend. All of the 17 jurisdictions that had significant trends in average scale scores in the original analysis also had significant trends in the revised analysis. In addition, seven jurisdictions that did not have significant trends in the original analysis had significant trends in revision. A number of changes in the percent of students at or above the achievement levels occurred due to the combination of the revision of scale scores and achievement level cutpoints for the 1992 data. As a result, more differences across the two years were significant. For 15 jurisdictions, there was an increase in the percent of students at or above an achievement level from 1990 to 1992 that did not change when the analysis was redone. There were nine jurisdictions where there was a significant trend upward in the percent of students at or above an achievement level only after revision. For only one jurisdiction was a trend no longer significant after revision (the percent at or above advanced for Michigan).

Table K-2

Original and Revised ACT Achievement Level Cut Scores for 1992 Mathematics

		Basic	Proficient	Advanced
Grade 4	Original	211	248	280
	Revised	214	249	282
Grade 8	Original	256	294	331
	Revised	262	299	333

In summary, while changes in average scale score, in percent of students at or above an achievement level, and in 1990 to 1992 trends in these statistics did occur, the meaning of the results were constant for most jurisdictions. An exception was that seven jurisdictions had significant differences in mean scale score from 1990 to 1992 that did not appear in the 1992 state reports. Also, 10 jurisdictions had changes in the percent of students at or above at least one achievement level.

Table K-3

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Original Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	206.9(1.6)	32.0(0.6)	165.3(1.7)	184.2(1.5)	206.8(2.4)	230.1(1.7)	248.8(1.8)
Arizona	213.8(1.1)	31.3(0.5)	171.8(2.1)	192.6(1.7)	215.4(1.3)	235.6(1.3)	253.3(2.3)
Arkansas	208.7(0.9)	30.9(0.6)	167.1(1.3)	187.4(1.1)	210.0(1.3)	230.4(1.0)	247.9(1.5)
California	207.1(1.6)	36.6(0.8)	157.6(2.4)	183.0(2.7)	209.3(1.3)	232.7(1.5)	252.9(1.9)
Colorado	219.8(1.0)	31.2(0.4)	178.8(1.7)	199.5(1.0)	221.0(1.4)	241.0(1.4)	259.2(1.4)
Connecticut	225.8(1.2)	32.1(0.7)	183.6(2.2)	204.6(1.6)	227.0(1.7)	248.2(1.7)	265.8(1.3)
Delaware	216.6(0.8)	32.4(0.7)	174.6(1.5)	193.7(1.0)	216.4(1.0)	239.4(1.5)	258.9(1.4)
District of Columbia	191.2(0.5)	32.8(0.4)	151.7(0.7)	169.0(0.7)	189.5(0.7)	210.9(0.9)	233.2(2.2)
Florida	212.4(1.5)	32.6(0.8)	169.6(2.5)	191.2(2.0)	213.6(1.8)	234.5(1.4)	253.6(2.6)
Georgia	214.3(1.3)	32.8(0.6)	171.3(2.0)	191.8(1.2)	215.2(1.3)	237.3(1.7)	256.8(2.0)
Hawaii	212.8(1.3)	34.0(0.7)	167.5(1.7)	190.1(1.6)	214.1(1.9)	236.8(1.2)	256.3(2.1)
Idaho	220.3(1.0)	28.1(0.5)	183.4(1.4)	201.7(2.5)	221.9(0.9)	240.0(0.7)	255.6(1.2)
Indiana	219.7(1.1)	28.3(0.5)	183.6(1.2)	199.9(1.7)	219.7(1.2)	239.3(1.2)	256.2(1.0)
Iowa	229.0(1.1)	29.6(0.5)	190.5(2.2)	210.0(1.1)	230.5(0.8)	249.4(0.7)	265.8(1.1)
Kentucky	213.6(1.0)	29.8(0.6)	175.8(1.7)	193.3(1.1)	213.1(1.1)	233.9(0.9)	252.6(1.7)
Louisiana	202.8(1.4)	32.2(0.9)	160.4(2.3)	181.3(1.6)	203.1(2.0)	225.1(3.2)	244.0(1.5)
Maine	230.7(1.0)	28.3(0.7)	194.0(1.9)	212.2(1.2)	231.9(1.8)	250.5(1.0)	265.1(1.3)
Maryland	216.1(1.3)	35.2(0.8)	169.5(2.0)	191.5(2.6)	217.6(2.2)	241.1(1.2)	260.5(1.6)
Massachusetts	225.5(1.2)	31.2(0.7)	184.4(1.5)	205.3(1.5)	227.0(1.3)	247.1(1.4)	264.0(1.1)
Michigan	218.6(1.8)	32.9(1.0)	174.3(3.3)	197.9(2.3)	221.1(1.8)	241.8(1.5)	258.9(1.6)
Minnesota	227.5(0.9)	31.1(0.6)	185.9(3.8)	207.7(1.2)	229.5(1.0)	249.4(0.9)	265.8(1.0)
Mississippi	200.1(1.1)	31.8(0.6)	159.2(1.7)	178.3(1.0)	200.2(1.3)	222.4(1.2)	240.7(1.8)
Missouri	221.0(1.2)	30.3(0.7)	181.6(2.9)	201.2(1.4)	221.8(1.5)	242.1(1.2)	259.7(1.4)
Nebraska	224.2(1.3)	30.8(0.6)	183.3(1.9)	203.8(1.7)	225.8(1.1)	245.5(1.4)	262.4(1.6)
New Hampshire	228.6(1.2)	28.7(0.5)	191.6(1.6)	210.0(1.2)	229.2(1.4)	248.6(1.3)	264.6(2.5)
New Jersey	226.1(1.5)	31.4(0.9)	184.6(2.8)	205.6(1.9)	227.9(1.6)	248.3(1.1)	265.0(2.3)
New Mexico	211.8(1.5)	30.2(0.7)	172.5(2.5)	191.1(1.8)	212.3(1.0)	232.2(1.7)	250.7(2.5)
New York	217.2(1.3)	32.8(0.9)	173.3(3.2)	195.9(1.4)	218.5(1.8)	240.1(1.7)	258.4(1.6)
North Carolina	211.4(1.1)	33.1(0.6)	167.7(1.6)	188.2(1.4)	212.7(1.4)	234.6(1.3)	253.0(1.2)
North Dakota	227.6(0.8)	26.9(0.6)	192.8(2.8)	210.2(1.9)	228.3(0.8)	246.3(0.8)	261.0(1.1)
Ohio	217.5(1.2)	31.4(0.8)	177.2(2.7)	196.4(1.5)	218.0(1.3)	239.1(2.3)	257.7(1.4)
Oklahoma	219.0(1.0)	27.4(0.6)	183.7(1.5)	200.9(1.2)	219.2(1.1)	237.2(1.4)	253.8(2.2)
Pennsylvania	223.2(1.4)	31.4(0.7)	181.0(1.8)	202.5(1.9)	224.8(1.8)	245.7(1.6)	262.0(2.3)
Rhode Island	214.0(1.6)	32.0(0.9)	171.9(3.1)	193.2(2.9)	215.7(1.8)	235.9(2.0)	253.7(2.2)
South Carolina	211.1(1.1)	31.8(0.6)	170.7(1.3)	189.1(1.2)	210.3(1.2)	233.3(1.4)	252.9(2.4)
Tennessee	209.4(1.4)	30.8(0.6)	169.3(2.0)	188.3(1.9)	210.3(1.7)	230.8(1.5)	248.5(1.9)
Texas	216.6(1.3)	31.3(0.8)	176.6(2.2)	196.3(1.5)	217.0(1.6)	237.9(1.6)	256.5(2.7)
Utah	222.8(1.0)	29.3(0.6)	184.8(1.6)	203.7(0.9)	223.8(1.3)	242.8(0.8)	259.8(0.9)
Virginia	219.6(1.3)	32.6(0.7)	177.5(1.4)	197.4(1.6)	219.8(1.1)	241.9(1.8)	261.7(2.8)
West Virginia	213.9(1.1)	30.1(0.6)	174.9(1.5)	193.9(1.4)	214.1(1.2)	234.3(1.4)	252.2(1.8)
Wisconsin	227.7(1.1)	29.6(0.7)	188.5(2.1)	208.7(1.0)	229.4(1.2)	248.3(1.3)	264.2(1.3)
Wyoming	224.2(1.0)	27.2(0.5)	189.1(2.1)	206.8(1.9)	225.1(1.2)	242.9(1.3)	258.2(1.2)
Guam	191.1(0.8)	34.3(0.6)	147.1(1.8)	167.5(0.9)	191.4(1.1)	213.8(1.4)	235.3(1.3)
Virgin Islands	178.0(1.2)	28.3(0.7)	140.4(1.8)	159.2(2.2)	178.7(1.3)	197.2(2.2)	213.8(2.4)

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Table K-4

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Revised Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	208.3(1.6)	31.3(0.6)	167.7(1.4)	186.2(1.8)	208.4(2.2)	231.1(1.5)	249.3(2.4)
Arizona	215.3(1.1)	30.3(0.5)	174.4(1.8)	194.6(2.3)	216.9(1.3)	236.5(0.9)	253.4(1.4)
Arkansas	210.2(0.9)	30.1(0.6)	169.7(1.5)	189.5(1.1)	211.5(1.2)	231.4(1.1)	248.5(1.5)
California	208.4(1.6)	36.0(0.8)	159.8(1.9)	184.6(2.3)	210.7(1.5)	233.5(1.3)	253.1(2.6)
Colorado	221.0(1.0)	30.3(0.4)	181.2(1.8)	201.4(1.0)	222.3(0.9)	241.7(1.2)	259.1(0.8)
Connecticut	226.8(1.1)	31.0(0.7)	185.8(2.2)	206.4(1.3)	228.3(1.5)	248.5(0.9)	265.3(1.6)
Delaware	217.9(0.8)	31.4(0.7)	177.0(1.4)	195.7(1.3)	217.9(0.8)	240.1(1.4)	258.8(1.4)
District of Columbia	192.6(0.5)	32.6(0.4)	153.2(0.8)	170.7(1.1)	191.0(0.6)	211.8(1.2)	234.4(1.4)
Florida	213.7(1.5)	31.8(0.7)	171.7(2.1)	193.0(1.8)	215.2(1.5)	235.3(1.4)	253.8(3.1)
Georgia	215.6(1.2)	31.9(0.6)	173.7(1.7)	193.7(1.4)	216.7(1.4)	238.2(1.4)	256.8(1.2)
Hawaii	214.1(1.3)	33.2(0.6)	170.0(1.5)	191.8(2.3)	215.5(1.3)	237.5(1.1)	256.5(1.9)
Idaho	221.6(1.0)	27.2(0.5)	185.6(1.9)	203.5(1.9)	223.3(1.2)	240.7(0.7)	255.5(1.1)
Indiana	221.0(1.0)	27.4(0.5)	186.0(1.3)	201.7(1.3)	221.2(0.9)	240.1(1.2)	256.3(1.0)
Iowa	229.9(1.0)	28.6(0.5)	192.7(2.3)	211.8(1.4)	231.6(0.9)	249.7(0.7)	265.4(1.5)
Kentucky	215.0(1.0)	28.9(0.6)	178.2(1.5)	195.2(1.0)	214.7(1.0)	234.9(1.0)	252.8(1.3)
Louisiana	204.1(1.5)	31.8(1.1)	162.9(2.5)	183.3(2.0)	204.8(1.4)	226.4(2.4)	244.5(1.4)
Maine	231.6(1.0)	27.4(0.7)	196.2(1.9)	213.8(1.3)	232.8(1.3)	250.8(1.0)	264.6(1.2)
Maryland	217.3(1.3)	34.3(0.8)	171.8(1.7)	193.4(2.2)	219.0(1.5)	242.0(1.7)	260.5(1.2)
Massachusetts	226.6(1.2)	30.2(0.6)	186.7(1.2)	207.2(1.5)	228.3(1.4)	247.6(1.6)	263.6(1.7)
Michigan	219.9(1.7)	31.9(1.0)	176.8(3.1)	199.9(2.8)	222.5(1.7)	242.5(1.6)	258.7(1.6)
Minnesota	228.5(0.9)	30.0(0.5)	188.3(4.1)	209.4(1.1)	230.6(0.9)	249.6(1.1)	265.3(1.4)
Mississippi	201.8(1.1)	31.1(0.6)	161.7(1.5)	180.5(1.4)	202.1(1.6)	223.8(1.2)	241.6(1.2)
Missouri	222.2(1.2)	29.3(0.7)	184.0(1.7)	203.1(1.4)	223.1(1.4)	242.7(1.1)	259.5(1.6)
Nebraska	225.3(1.2)	29.7(0.6)	185.7(1.8)	205.7(1.8)	227.0(1.3)	246.0(1.3)	262.1(1.8)
New Hampshire	229.7(1.2)	27.6(0.5)	193.8(1.1)	211.7(1.2)	230.3(1.3)	248.9(1.3)	264.1(2.3)
New Jersey	227.1(1.5)	30.3(0.9)	186.9(3.1)	207.4(1.7)	229.1(1.5)	248.7(1.0)	264.6(1.9)
New Mexico	213.3(1.4)	29.3(0.6)	175.0(2.9)	193.2(2.1)	213.9(1.2)	233.3(2.1)	250.9(1.8)
New York	218.4(1.2)	32.0(0.9)	175.7(2.2)	197.6(1.0)	220.0(1.7)	240.8(1.6)	258.3(1.0)
North Carolina	212.9(1.1)	32.2(0.6)	170.4(1.1)	190.4(1.4)	214.3(1.3)	235.5(1.6)	253.0(1.2)
North Dakota	228.7(0.8)	25.9(0.5)	195.0(2.4)	212.0(1.1)	229.4(0.8)	246.7(0.8)	260.8(1.4)
Ohio	218.7(1.2)	30.5(0.8)	179.5(1.8)	198.2(1.5)	219.4(0.9)	239.8(1.7)	257.4(1.1)
Oklahoma	220.3(1.0)	26.5(0.6)	186.0(1.7)	202.8(0.9)	220.6(1.2)	238.0(1.4)	253.9(1.9)
Pennsylvania	224.3(1.3)	30.4(0.7)	183.4(1.9)	204.3(1.5)	226.0(1.7)	246.1(1.8)	261.7(1.8)
Rhode Island	215.4(1.5)	31.0(0.9)	174.4(2.8)	195.3(3.0)	217.3(1.9)	236.8(1.7)	253.8(3.0)
South Carolina	212.5(1.1)	31.0(0.6)	173.0(1.3)	191.2(1.1)	211.9(1.2)	234.2(1.4)	253.1(1.8)
Tennessee	210.9(1.4)	29.9(0.6)	171.8(2.3)	190.5(2.1)	212.0(1.6)	231.9(1.4)	248.8(1.4)
Texas	217.9(1.2)	30.3(0.8)	179.0(2.4)	198.3(1.4)	218.5(1.5)	238.7(1.8)	256.5(2.3)
Utah	224.0(1.0)	28.3(0.6)	187.0(1.6)	205.6(1.2)	225.1(1.3)	243.3(1.0)	259.8(1.0)
Virginia	220.8(1.3)	31.7(0.7)	179.8(1.3)	199.3(1.5)	221.2(1.4)	242.5(1.9)	261.3(2.2)
West Virginia	215.3(1.1)	29.3(0.5)	177.3(1.4)	195.8(1.6)	215.6(1.1)	235.2(1.4)	252.3(1.6)
Wisconsin	228.7(1.1)	28.5(0.7)	190.8(1.9)	210.4(0.7)	230.5(1.3)	248.6(1.2)	263.6(1.8)
Wyoming	225.4(0.9)	26.2(0.5)	191.3(1.6)	208.6(1.4)	226.4(1.2)	243.5(0.9)	258.2(0.9)
Guam	192.8(0.8)	33.7(0.6)	149.6(1.4)	169.6(1.2)	193.2(1.1)	215.4(1.3)	236.2(1.7)
Virgin Islands	178.9(1.2)	28.8(0.7)	140.7(2.3)	159.9(2.2)	179.8(1.7)	198.3(1.2)	215.0(2.5)

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Table K-5

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Original Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	251.3(1.7)	35.8(1.2)	205.5(1.9)	226.8(1.8)	250.6(2.0)	275.7(1.7)	298.8(2.0)
Arizona	264.6(1.3)	32.8(0.7)	222.1(1.6)	242.8(1.3)	265.0(1.9)	286.9(1.2)	306.5(1.3)
Arkansas	255.4(1.2)	34.3(0.6)	210.9(1.6)	232.9(1.2)	256.2(1.2)	278.8(1.6)	298.6(1.6)
California	260.1(1.7)	38.7(1.1)	208.8(2.7)	233.7(2.6)	261.4(1.8)	287.9(1.7)	308.8(2.5)
Colorado	271.7(1.1)	33.1(0.6)	227.6(1.6)	250.1(1.2)	273.3(1.1)	295.0(1.2)	313.3(1.2)
Connecticut	273.1(1.1)	36.0(0.9)	224.3(2.6)	248.8(1.7)	275.4(0.8)	299.2(1.0)	318.4(1.4)
Delaware	262.1(1.0)	35.7(0.7)	216.4(1.8)	238.7(0.9)	262.4(1.3)	286.6(1.5)	307.0(1.4)
District of Columbia	233.9(0.9)	36.5(1.0)	188.6(1.0)	208.7(1.2)	233.3(1.8)	257.2(2.8)	280.2(1.7)
Florida	259.1(1.5)	36.8(0.8)	210.3(3.0)	234.0(1.6)	260.1(2.0)	284.8(1.7)	306.5(2.0)
Georgia	258.5(1.2)	34.6(0.6)	213.8(1.5)	234.7(1.5)	259.4(1.3)	282.9(2.1)	303.1(1.5)
Hawaii	256.6(0.9)	37.8(0.7)	208.2(1.5)	230.9(1.0)	257.5(1.6)	282.8(1.0)	304.7(1.3)
Idaho	274.4(0.8)	30.5(0.5)	234.9(1.1)	254.5(0.9)	275.2(1.2)	295.7(0.8)	313.0(1.1)
Indiana	269.4(1.2)	33.9(0.6)	225.3(1.5)	246.8(1.2)	269.8(1.3)	292.7(1.9)	313.1(2.9)
Iowa	282.8(1.0)	30.0(0.6)	243.9(2.1)	262.5(1.4)	283.7(1.1)	303.9(1.5)	320.6(1.6)
Kentucky	261.4(1.1)	34.3(0.6)	216.4(1.7)	238.5(1.6)	262.0(1.0)	284.6(1.3)	305.4(2.8)
Louisiana	249.1(1.7)	34.0(0.9)	204.6(2.6)	226.4(2.2)	249.7(1.6)	272.1(2.0)	293.0(1.8)
Maine	278.0(1.0)	30.7(0.8)	239.1(2.3)	258.2(1.2)	278.6(1.1)	299.0(1.7)	316.4(1.3)
Maryland	264.2(1.3)	39.2(0.9)	212.9(1.8)	236.9(2.3)	265.0(1.3)	292.4(1.6)	313.5(1.6)
Massachusetts	272.1(1.1)	34.2(0.7)	228.6(1.4)	248.6(2.2)	272.9(2.0)	296.8(1.6)	315.7(1.7)
Michigan	266.6(1.4)	35.4(0.6)	220.0(1.4)	243.1(2.3)	268.3(1.6)	291.7(2.9)	311.2(2.3)
Minnesota	281.8(1.0)	31.9(0.5)	240.0(1.4)	260.2(1.4)	282.9(1.3)	304.3(1.4)	322.3(1.4)
Mississippi	245.5(1.2)	34.8(0.6)	200.6(1.2)	221.3(1.3)	245.4(1.2)	270.0(1.6)	290.9(2.0)
Missouri	270.4(1.2)	32.7(0.7)	227.9(2.9)	248.5(1.8)	271.8(1.4)	292.8(1.6)	311.5(1.3)
Nebraska	277.0(1.1)	32.4(0.6)	234.0(1.7)	256.4(1.2)	279.1(1.4)	299.7(1.0)	316.9(1.5)
New Hampshire	277.6(1.0)	30.4(0.7)	237.9(1.1)	257.7(0.8)	278.0(0.9)	298.5(1.1)	315.9(2.0)
New Jersey	271.2(1.6)	36.0(0.9)	222.2(1.9)	247.0(2.0)	272.9(1.9)	296.8(2.2)	317.1(1.6)
New Mexico	258.8(0.9)	32.3(0.7)	217.1(2.0)	237.4(0.9)	259.3(1.0)	280.9(1.0)	300.2(1.3)
New York	265.7(2.1)	39.4(1.3)	213.2(3.1)	240.9(2.7)	268.3(1.8)	292.7(1.4)	314.5(2.4)
North Carolina	257.6(1.2)	35.4(0.8)	212.3(2.6)	233.6(1.3)	258.5(1.2)	282.0(1.4)	302.7(1.5)
North Dakota	282.6(1.2)	28.3(0.6)	244.9(1.2)	263.7(1.4)	284.3(1.0)	302.0(1.4)	318.0(1.7)
Ohio	267.4(1.5)	34.4(0.9)	222.0(1.9)	244.4(2.0)	269.1(1.6)	291.6(1.4)	310.4(1.5)
Oklahoma	267.4(1.2)	32.3(0.6)	225.9(1.3)	247.1(1.4)	268.3(1.1)	290.1(1.4)	307.7(1.5)
Pennsylvania	270.7(1.5)	34.5(0.9)	225.1(2.3)	247.9(1.5)	272.2(1.4)	295.0(1.1)	314.5(1.8)
Rhode Island	265.1(0.7)	33.4(0.5)	220.9(1.2)	242.8(1.1)	266.7(1.2)	288.5(1.7)	306.9(1.1)
South Carolina	260.0(1.0)	35.3(0.7)	215.2(1.3)	235.2(1.1)	259.2(1.2)	284.6(1.7)	306.7(1.5)
Tennessee	258.0(1.4)	33.9(0.7)	214.0(2.1)	234.9(1.5)	258.2(1.6)	282.1(1.4)	301.6(1.5)
Texas	263.8(1.3)	37.2(0.7)	215.8(2.7)	237.5(1.2)	263.9(1.9)	289.4(2.3)	312.0(1.5)
Utah	273.6(0.7)	32.0(0.8)	231.6(1.2)	252.8(1.7)	274.9(0.8)	296.1(1.2)	313.7(1.2)
Virginia	267.1(1.2)	35.4(0.7)	221.4(1.5)	243.0(1.7)	267.4(1.7)	291.4(1.6)	313.4(1.5)
West Virginia	258.2(1.0)	31.1(0.6)	217.8(1.5)	237.0(1.0)	258.4(1.7)	280.5(1.1)	298.2(1.8)
Wisconsin	277.3(1.5)	33.2(0.7)	233.1(2.6)	256.7(2.1)	279.1(1.5)	300.6(1.5)	317.8(1.4)
Wyoming	274.4(0.9)	29.6(0.5)	236.5(1.0)	254.1(1.2)	275.2(1.2)	294.9(1.2)	312.1(1.1)
Guam	234.3(1.0)	39.2(0.8)	183.8(2.1)	207.1(1.8)	233.4(1.6)	261.4(2.5)	286.2(3.7)
Virgin Islands	221.8(1.1)	30.1(0.6)	183.1(1.2)	201.2(1.6)	221.4(1.2)	242.1(1.5)	260.2(1.6)

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Table K-6

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Weighted Means, Standard Deviations, and Percentiles
Revised Results

	MEAN	STD DEV	10TH	25TH	50TH	75TH	90TH
Alabama	252.2(1.7)	35.5(1.2)	206.8(1.8)	227.9(1.9)	251.6(1.7)	276.5(1.7)	299.2(2.3)
Arizona	265.4(1.3)	32.4(0.6)	223.3(2.3)	243.9(1.4)	265.9(1.8)	287.6(1.1)	306.8(1.2)
Arkansas	256.3(1.2)	33.9(0.6)	212.1(1.7)	234.1(1.4)	257.2(1.2)	279.5(1.4)	299.0(1.2)
California	260.9(1.7)	38.3(1.1)	210.1(1.8)	234.8(2.8)	262.3(1.4)	288.5(2.2)	309.0(2.2)
Colorado	272.4(1.0)	32.7(0.6)	228.8(1.8)	251.1(1.1)	274.1(1.2)	295.4(1.1)	313.5(1.1)
Connecticut	273.7(1.1)	35.6(0.9)	225.4(2.6)	249.8(1.4)	276.1(0.9)	299.6(0.8)	318.4(1.3)
Delaware	262.9(1.0)	35.3(0.7)	217.7(2.4)	239.7(1.2)	263.3(1.2)	287.2(1.7)	307.3(1.5)
District of Columbia	234.9(0.9)	36.2(0.9)	189.9(1.1)	210.0(1.2)	234.3(1.9)	258.1(2.1)	280.8(1.6)
Florida	259.9(1.5)	36.4(0.8)	211.5(2.9)	235.1(1.7)	260.9(1.9)	285.5(1.5)	306.7(1.8)
Georgia	259.4(1.2)	34.3(0.6)	215.0(1.4)	235.8(1.2)	260.3(1.3)	283.6(2.1)	303.3(1.3)
Hawaii	257.4(0.9)	37.3(0.6)	209.4(2.5)	232.0(0.9)	258.3(1.4)	283.4(1.0)	305.0(1.6)
Idaho	275.1(0.7)	30.1(0.5)	236.1(1.1)	255.4(1.0)	276.0(1.0)	296.1(0.9)	313.1(1.1)
Indiana	270.1(1.1)	33.5(0.6)	226.4(1.4)	247.8(1.5)	270.6(1.5)	293.2(1.5)	313.4(3.2)
Iowa	283.4(1.0)	29.5(0.6)	245.0(2.6)	263.4(1.2)	284.3(1.3)	304.2(1.8)	320.6(1.3)
Kentucky	262.2(1.1)	33.9(0.6)	217.6(1.8)	239.5(1.6)	262.9(1.1)	285.2(1.4)	305.6(2.3)
Louisiana	250.0(1.7)	33.7(0.8)	205.8(2.7)	227.4(1.9)	250.6(1.8)	272.9(1.8)	293.5(1.5)
Maine	278.6(1.0)	30.3(0.8)	240.3(2.0)	259.1(1.1)	279.4(1.3)	299.4(1.5)	316.5(1.7)
Maryland	264.8(1.3)	38.9(0.9)	214.1(2.6)	237.9(2.1)	265.9(0.9)	292.9(1.2)	313.6(1.9)
Massachusetts	272.8(1.0)	33.8(0.7)	229.7(1.4)	249.6(2.2)	273.7(1.3)	297.2(1.6)	315.7(1.5)
Michigan	267.4(1.4)	35.0(0.6)	221.2(1.1)	244.1(2.1)	269.1(1.4)	292.3(2.3)	311.4(2.2)
Minnesota	282.4(1.0)	31.5(0.5)	241.1(1.7)	261.1(1.2)	283.6(1.4)	304.5(1.3)	322.2(1.6)
Mississippi	246.5(1.2)	34.5(0.6)	201.8(1.1)	222.5(1.1)	246.4(1.3)	270.8(1.5)	291.4(1.3)
Missouri	271.1(1.2)	32.3(0.7)	229.0(2.3)	249.6(1.9)	272.6(1.3)	293.3(1.7)	311.6(1.4)
Nebraska	277.7(1.1)	32.0(0.5)	235.2(1.8)	257.3(1.2)	279.8(1.5)	300.1(1.3)	317.0(1.2)
New Hampshire	278.2(1.0)	30.0(0.7)	239.0(1.3)	258.6(0.7)	278.7(0.8)	298.9(1.3)	316.0(1.7)
New Jersey	271.9(1.6)	35.6(0.9)	223.4(2.0)	248.0(2.3)	273.6(1.8)	297.2(2.0)	317.0(2.1)
New Mexico	259.6(0.9)	31.9(0.7)	218.4(2.7)	238.5(1.1)	260.1(0.9)	281.6(1.1)	300.6(1.0)
New York	266.4(2.1)	39.0(1.3)	214.6(3.3)	241.9(2.5)	269.2(1.9)	293.3(1.5)	314.6(2.0)
North Carolina	258.4(1.2)	35.1(0.8)	213.4(2.1)	234.6(1.8)	259.3(0.9)	282.6(1.2)	302.9(2.0)
North Dakota	283.2(1.1)	27.9(0.6)	246.0(1.3)	264.6(1.3)	284.9(1.0)	302.3(1.5)	317.9(1.6)
Ohio	268.1(1.5)	34.2(0.9)	223.1(2.3)	245.4(1.8)	269.9(1.5)	292.2(1.0)	310.6(1.6)
Oklahoma	268.1(1.1)	31.9(0.6)	227.0(1.1)	248.1(1.3)	269.1(1.1)	290.7(1.5)	308.1(1.3)
Pennsylvania	271.4(1.5)	34.1(0.9)	226.2(2.5)	248.9(1.3)	273.0(1.3)	295.4(1.2)	314.6(1.9)
Rhode Island	265.9(0.7)	33.1(0.5)	222.0(0.9)	243.8(1.2)	267.6(1.1)	289.1(1.5)	307.1(1.1)
South Carolina	260.8(1.0)	34.9(0.7)	216.4(1.6)	236.3(1.2)	260.0(1.3)	285.2(1.7)	307.0(1.7)
Tennessee	258.8(1.4)	33.5(0.7)	215.3(2.2)	236.0(1.5)	259.1(1.6)	282.8(1.8)	301.9(1.7)
Texas	264.6(1.3)	36.8(0.7)	217.0(2.0)	238.6(1.3)	264.8(1.6)	290.0(1.9)	312.0(2.1)
Utah	274.3(0.7)	31.6(0.8)	232.7(1.3)	253.8(1.3)	275.7(0.9)	296.6(1.2)	313.9(1.2)
Virginia	267.9(1.2)	35.0(0.6)	222.5(1.7)	244.0(1.7)	268.2(1.7)	291.9(1.6)	313.5(1.8)
West Virginia	259.1(1.0)	30.8(0.6)	219.0(1.8)	238.1(1.1)	259.4(1.4)	281.1(0.9)	298.6(1.5)
Wisconsin	277.9(1.5)	32.7(0.7)	234.3(2.3)	257.6(2.1)	279.8(1.3)	300.9(1.4)	317.9(1.2)
Wyoming	275.1(0.9)	29.2(0.5)	237.6(1.1)	255.1(1.1)	276.0(1.2)	295.4(1.0)	312.2(1.3)
Guam	235.1(1.0)	39.2(0.9)	184.5(1.9)	208.1(3.3)	234.3(1.9)	262.4(1.7)	286.7(1.8)
Virgin Islands	222.8(1.1)	30.0(0.6)	184.2(1.7)	202.2(1.8)	222.4(1.5)	243.0(1.6)	260.9(2.0)

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Table K-7

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

	N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	2605	1.9(0.1) [3%]	206.9(1.6)	0.6(0.2)	10.5(1.3)	44.7(2.2)	55.3(2.2)
Arizona	2741	1.8(0.0) [2%]	213.8(1.1)	1.2(0.3)	13.5(0.9)	55.2(1.7)	44.8(1.7)
Arkansas	2621	1.2(0.0) [4%]	208.7(0.9)	0.6(0.2)	10.0(0.8)	48.8(1.3)	51.2(1.3)
California	2412	12.3(0.3) [3%]	207.1(1.6)	1.6(0.5)	12.7(1.2)	48.0(2.0)	52.0(2.0)
Colorado	2906	1.7(0.1) [3%]	219.8(1.0)	2.1(0.4)	18.2(1.1)	62.5(1.6)	37.5(1.4)
Connecticut	2600	1.2(0.0) [3%]	225.8(1.2)	3.7(0.6)	25.2(1.4)	68.8(1.5)	31.2(1.5)
Delaware	2040	0.3(0.0) [0%]	216.6(0.8)	2.3(0.4)	17.0(0.8)	56.2(1.0)	43.8(1.0)
District of Columbia	2399	0.2(0.0) [0%]	191.2(0.5)	1.0(0.2)	5.5(0.3)	24.9(1.0)	75.1(1.0)
Florida	2828	5.4(0.2) [3%]	212.4(1.5)	1.5(0.4)	13.5(1.4)	53.4(2.0)	46.6(2.0)
Georgia	2766	3.4(0.1) [4%]	214.3(1.3)	1.5(0.4)	15.7(1.2)	54.9(1.7)	45.1(1.7)
Hawaii	2625	0.5(0.0) [2%]	212.8(1.3)	1.5(0.4)	15.2(1.0)	53.7(1.8)	46.3(1.8)
Idaho	2784	0.6(0.0) [3%]	220.3(1.0)	1.1(0.3)	16.1(1.1)	64.2(1.7)	35.8(1.7)
Indiana	2593	2.7(0.1) [3%]	219.7(1.1)	1.5(0.3)	16.2(1.1)	61.6(1.6)	38.4(1.6)
Iowa	2770	1.3(0.0) [4%]	229.0(1.1)	3.1(0.5)	27.0(1.3)	74.1(1.4)	25.9(1.4)
Kentucky	2703	1.8(0.1) [4%]	213.6(1.0)	1.4(0.5)	12.9(1.1)	52.7(1.5)	47.3(1.5)
Louisiana	2792	2.2(0.1) [3%]	202.8(1.4)	0.6(0.2)	7.9(0.8)	40.5(2.0)	59.5(2.0)
Maine	1898	0.6(0.0) [3%]	230.7(1.0)	3.0(0.6)	28.3(1.5)	76.3(1.3)	23.7(1.3)
Maryland	2844	2.0(0.1) [3%]	216.1(1.3)	2.8(0.4)	18.9(1.2)	56.8(1.6)	43.2(1.6)
Massachusetts	2549	2.1(0.1) [4%]	225.5(1.2)	3.1(0.5)	24.0(1.5)	69.7(1.6)	30.3(1.6)
Michigan	2412	4.1(0.1) [4%]	218.6(1.8)	1.7(0.5)	19.1(1.7)	62.1(2.2)	37.9(2.2)
Minnesota	2640	2.1(0.1) [4%]	227.5(0.9)	3.4(0.5)	26.8(1.2)	71.8(1.4)	28.2(1.4)
Mississippi	2712	1.4(0.0) [3%]	200.1(1.1)	0.4(0.1)	6.5(0.7)	37.3(1.3)	62.7(1.3)
Missouri	2509	2.1(0.1) [5%]	221.0(1.2)	1.9(0.3)	19.3(1.3)	63.6(1.6)	36.4(1.6)
Nebraska	2327	0.7(0.0) [3%]	224.2(1.3)	2.6(0.5)	22.5(1.7)	68.1(1.8)	31.9(1.8)
New Hampshire	2265	0.5(0.0) [3%]	228.6(1.2)	3.0(0.6)	25.7(1.7)	73.8(1.6)	26.2(1.6)
New Jersey	2231	2.8(0.1) [4%]	226.1(1.5)	3.2(0.7)	25.3(1.6)	69.9(2.1)	30.1(2.1)
New Mexico	2342	0.8(0.1) [6%]	211.8(1.5)	1.0(0.4)	11.4(1.3)	51.6(1.9)	48.4(1.9)
New York	2284	6.7(0.2) [3%]	217.2(1.3)	2.0(0.3)	17.4(1.3)	58.8(1.9)	41.2(1.9)
North Carolina	2884	3.0(0.1) [3%]	211.4(1.1)	1.6(0.4)	13.2(0.9)	52.1(1.6)	47.9(1.6)
North Dakota	2193	0.3(0.0) [4%]	227.6(0.8)	1.8(0.3)	22.9(1.1)	74.2(1.2)	25.8(1.2)
Ohio	2637	4.9(0.1) [3%]	217.5(1.2)	1.9(0.3)	16.8(1.1)	58.8(1.7)	41.2(1.7)
Oklahoma	2254	1.6(0.0) [3%]	219.0(1.0)	1.2(0.4)	14.4(1.1)	61.5(1.6)	38.5(1.6)
Pennsylvania	2740	4.6(0.2) [4%]	223.2(1.4)	2.6(0.5)	22.5(1.5)	66.4(1.9)	33.6(1.9)
Rhode Island	2390	0.4(0.0) [5%]	214.0(1.6)	1.6(0.4)	13.8(1.2)	55.8(2.2)	44.2(2.2)
South Carolina	2771	1.8(0.1) [3%]	211.1(1.1)	1.2(0.3)	13.3(1.1)	49.3(1.5)	50.7(1.5)
Tennessee	2708	2.4(0.1) [3%]	209.4(1.4)	0.7(0.2)	10.2(1.0)	49.0(2.1)	51.0(2.1)
Texas	2623	9.0(0.3) [4%]	216.6(1.3)	1.8(0.5)	15.5(1.3)	57.6(1.7)	42.4(1.7)
Utah	2799	1.3(0.0) [2%]	222.8(1.0)	1.9(0.3)	19.5(1.1)	67.4(1.6)	32.6(1.6)
Virginia	2786	2.8(0.1) [3%]	219.6(1.3)	3.1(0.7)	19.4(1.6)	60.3(1.4)	39.7(1.4)
West Virginia	2786	0.9(0.0) [4%]	213.9(1.1)	1.3(0.3)	12.8(1.0)	54.1(1.6)	45.9(1.6)
Wisconsin	2780	2.1(0.1) [4%]	227.7(1.1)	3.0(0.5)	25.3(1.4)	72.4(1.3)	27.6(1.3)
Wyoming	2605	0.3(0.0) [3%]	224.2(1.0)	1.5(0.3)	19.4(1.2)	70.1(1.4)	29.9(1.4)
Guam	1933	0.1(0.0) [0%]	191.1(0.8)	0.4(0.1)	4.9(0.5)	28.0(1.2)	72.0(1.2)
Virgin Islands	905	0.1(0.0) [0%]	178.0(1.2)	0.0(0.0)	0.4(0.2)	11.8(1.6)	88.2(1.6)

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Table K-8

NAEP 1992 Trial State Assessment in Mathematics
Grade 4 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

	N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	2605	1.9(0.1) [3%]	208.3(1.6)	0.5(0.1)	10.1(1.2)	43.0(2.1)	57.0(2.1)
Arizona	2741	1.8(0.0) [2%]	215.3(1.1)	0.8(0.2)	13.1(0.9)	53.5(1.6)	46.5(1.6)
Arkansas	2621	1.2(0.0) [4%]	210.2(0.9)	0.4(0.2)	9.7(0.7)	46.9(1.5)	53.1(1.5)
California	2412	12.3(0.3) [3%]	208.4(1.6)	1.3(0.4)	12.4(1.2)	46.4(1.9)	53.6(1.9)
Colorado	2906	1.7(0.1) [3%]	221.0(1.0)	1.5(0.4)	17.5(1.0)	60.8(1.4)	39.2(1.4)
Connecticut	2600	1.2(0.0) [3%]	226.8(1.1)	2.9(0.5)	24.4(1.4)	67.3(1.6)	32.7(1.6)
Delaware	2040	0.3(0.0) [0%]	217.9(0.8)	1.8(0.3)	16.5(0.9)	54.6(1.0)	45.4(1.0)
District of Columbia	2399	0.2(0.0) [0%]	192.6(0.5)	0.9(0.2)	5.5(0.3)	23.1(0.9)	76.9(0.9)
Florida	2828	5.4(0.2) [3%]	213.7(1.5)	1.2(0.3)	13.3(1.4)	51.6(1.7)	48.4(1.7)
Georgia	2766	3.4(0.1) [4%]	215.6(1.2)	1.1(0.3)	15.3(1.2)	53.1(1.7)	46.9(1.7)
Hawaii	2625	0.5(0.0) [2%]	214.1(1.3)	1.1(0.2)	14.6(0.9)	51.9(1.8)	48.1(1.8)
Idaho	2784	0.6(0.0) [3%]	221.6(1.0)	0.7(0.3)	15.7(1.0)	62.7(1.7)	37.3(1.7)
Indiana	2593	2.7(0.1) [3%]	221.0(1.0)	1.0(0.2)	15.6(1.1)	59.8(1.7)	40.2(1.7)
Iowa	2770	1.3(0.0) [4%]	229.9(1.0)	2.3(0.4)	26.0(1.2)	72.4(1.5)	27.6(1.5)
Kentucky	2703	1.8(0.1) [4%]	215.0(1.0)	1.0(0.3)	12.6(1.2)	50.9(1.5)	49.1(1.5)
Louisiana	2792	2.2(0.1) [3%]	204.1(1.5)	0.4(0.2)	7.6(0.8)	38.8(2.0)	61.2(2.0)
Maine	1898	0.6(0.0) [3%]	231.6(1.0)	2.4(0.5)	27.4(1.5)	74.8(1.5)	25.2(1.5)
Maryland	2844	2.0(0.1) [3%]	217.3(1.3)	2.2(0.3)	18.4(1.2)	55.1(1.6)	44.9(1.6)
Massachusetts	2549	2.1(0.1) [4%]	226.6(1.2)	2.4(0.5)	23.3(1.5)	68.5(1.6)	31.5(1.6)
Michigan	2412	4.1(0.1) [4%]	219.9(1.7)	1.2(0.4)	18.5(1.7)	60.5(2.2)	39.5(2.2)
Minnesota	2640	2.1(0.1) [4%]	228.5(0.9)	2.5(0.4)	25.9(1.3)	70.6(1.6)	29.4(1.6)
Mississippi	2712	1.4(0.0) [3%]	201.8(1.1)	0.3(0.1)	6.3(0.6)	35.8(1.3)	64.2(1.3)
Missouri	2509	2.1(0.1) [5%]	222.2(1.2)	1.3(0.3)	18.6(1.3)	62.1(1.7)	37.9(1.7)
Nebraska	2327	0.7(0.0) [3%]	225.3(1.2)	2.0(0.5)	21.8(1.6)	66.6(1.8)	33.4(1.8)
New Hampshire	2265	0.5(0.0) [3%]	229.7(1.2)	2.1(0.4)	24.9(1.6)	72.3(1.6)	27.7(1.6)
New Jersey	2231	2.8(0.1) [4%]	227.1(1.5)	2.5(0.6)	24.6(1.5)	68.2(2.1)	31.8(2.1)
New Mexico	2342	0.8(0.1) [6%]	213.3(1.4)	0.6(0.2)	11.1(1.3)	49.8(2.0)	50.2(2.0)
New York	2284	6.7(0.2) [3%]	218.4(1.2)	1.5(0.3)	17.0(1.3)	57.0(1.8)	43.0(1.8)
North Carolina	2884	3.0(0.1) [3%]	212.9(1.1)	1.2(0.3)	12.7(0.8)	50.3(1.6)	49.7(1.6)
North Dakota	2193	0.3(0.0) [4%]	228.7(0.8)	1.3(0.3)	22.2(1.1)	72.5(1.3)	27.5(1.3)
Ohio	2637	4.9(0.1) [3%]	218.7(1.2)	1.4(0.3)	16.1(1.2)	57.0(1.7)	43.0(1.7)
Oklahoma	2254	1.6(0.0) [3%]	220.3(1.0)	0.8(0.3)	14.0(1.2)	59.5(1.7)	40.5(1.7)
Pennsylvania	2740	4.6(0.2) [4%]	224.3(1.3)	2.0(0.4)	21.8(1.5)	64.9(2.0)	35.1(2.0)
Rhode Island	2390	0.4(0.0) [5%]	215.4(1.5)	1.2(0.4)	13.3(1.1)	54.2(2.2)	45.8(2.2)
South Carolina	2771	1.8(0.1) [3%]	212.5(1.1)	0.9(0.3)	12.8(1.1)	47.6(1.7)	52.4(1.7)
Tennessee	2708	2.4(0.1) [3%]	210.9(1.4)	0.5(0.2)	9.9(1.0)	47.3(2.0)	52.7(2.0)
Texas	2623	9.0(0.3) [4%]	217.9(1.2)	1.2(0.3)	15.0(1.2)	55.7(1.6)	44.3(1.6)
Utah	2799	1.3(0.0) [2%]	224.0(1.0)	1.4(0.3)	19.0(1.1)	65.6(1.7)	34.4(1.7)
Virginia	2786	2.8(0.1) [3%]	220.8(1.3)	2.3(0.5)	18.8(1.5)	58.6(1.4)	41.4(1.4)
West Virginia	2786	0.9(0.0) [4%]	215.3(1.1)	1.0(0.3)	12.2(0.9)	52.4(1.5)	47.6(1.5)
Wisconsin	2780	2.1(0.1) [4%]	228.7(1.1)	2.2(0.4)	24.5(1.4)	70.9(1.4)	29.1(1.4)
Wyoming	2605	0.3(0.0) [3%]	225.4(0.9)	1.0(0.3)	18.7(1.1)	68.6(1.4)	31.4(1.4)
Guam	1933	0.1(0.0) [0%]	192.8(0.8)	0.3(0.2)	4.7(0.5)	26.3(1.4)	73.7(1.4)
Virgin Islands	905	0.1(0.0) [0%]	178.9(1.2)	0.0(0.0)	0.5(0.2)	10.6(1.4)	89.4(1.4)

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Table K-9

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	1992	2522	2.0(0.1) [3%]	251.3(1.7)	1.1(0.3)	12.3(1.1)	44.3(2.0)	55.7(2.0)
	1990	2531	2.2(0.1) [3%]	252.9(1.1)	1.1(0.2)	11.7(0.8)	47.2(1.6)	52.8(1.6)
Arizona	1992	2617	1.7(0.1) [4%]	264.6(1.3)>	1.8(0.4)	18.8(1.4)	61.4(1.8)>	38.6(1.8)<
	1990	2558	1.8(0.1) [3%]	259.6(1.3)	1.5(0.4)	16.1(1.1)	54.8(1.8)	45.2(1.8)
Arkansas	1992	2556	1.2(0.0) [2%]	255.4(1.2)	1.0(0.3)	12.9(1.0)	50.2(1.7)	49.8(1.7)
	1990	2669	1.5(0.0) [2%]	256.2(0.9)	0.9(0.2)	12.4(1.0)	51.2(1.3)	48.8(1.3)
California	1992	2516	12.5(0.3) [3%]	260.1(1.7)	2.6(0.7)	19.7(1.4)	55.1(2.0)	44.9(2.0)
	1990	2424	14.2(0.4) [3%]	256.3(1.3)	2.0(0.4)	15.9(1.3)	50.9(1.6)	49.1(1.6)
Colorado	1992	2799	1.6(0.0) [2%]	271.7(1.1)>	2.5(0.5)	26.2(1.3)>	69.2(1.3)>	30.8(1.3)<
	1990	2675	1.7(0.0) [2%]	267.4(0.9)	2.2(0.4)	21.6(1.0)	64.3(1.1)	35.7(1.1)
Connecticut	1992	2613	1.2(0.0) [3%]	273.1(1.1)>	4.1(0.6)	30.1(1.1)>	68.9(1.4)	31.1(1.4)
	1990	2672	1.4(0.0) [3%]	269.9(1.0)	3.9(0.4)	26.2(1.1)	65.9(1.3)	34.1(1.3)
Delaware	1992	1934	0.3(0.0) [0%]	262.1(1.0)	2.5(0.4)	18.5(1.1)	57.0(1.2)	43.0(1.2)
	1990	2110	0.3(0.0) [0%]	260.7(0.9)	2.1(0.5)	18.6(0.9)	54.5(1.3)	45.5(1.3)
Dist of Columbia	1992	1816	0.2(0.0) [0%]	233.9(0.9)>	0.7(0.2)	5.6(1.0)	26.0(1.3)>	74.0(1.3)<
	1990	2135	0.2(0.0) [0%]	231.4(0.9)	0.8(0.2)	3.8(0.7)	21.1(1.0)	78.9(1.0)
Florida	1992	2549	4.6(0.2) [3%]	259.1(1.5)	1.8(0.4)	17.6(1.3)	54.7(1.9)	45.3(1.9)
	1990	2534	5.5(0.2) [3%]	255.3(1.2)	1.7(0.4)	14.8(1.0)	49.2(1.4)	50.8(1.4)
Georgia	1992	2589	3.1(0.1) [4%]	258.5(1.2)	1.4(0.3)	15.9(1.0)	53.5(1.5)	46.5(1.5)
	1990	2766	3.7(0.1) [4%]	258.8(1.3)	2.6(0.5)	17.2(1.3)	53.4(1.5)	46.6(1.5)
Hawaii	1992	2454	0.5(0.0) [0%]	256.6(0.9)>	2.2(0.4)	16.5(0.8)	51.2(1.2)>	48.8(1.2)<
	1990	2551	0.5(0.0) [0%]	251.0(0.8)	1.8(0.3)	14.3(0.8)	45.3(1.0)	54.7(1.0)
Idaho	1992	2615	0.7(0.0) [2%]	274.4(0.8)>	2.5(0.4)	26.9(1.2)	73.4(1.1)	26.6(1.1)
	1990	2716	0.8(0.0) [1%]	271.4(0.8)	1.5(0.4)	23.0(1.4)	70.1(1.2)	29.9(1.2)
Indiana	1992	2659	3.0(0.1) [3%]	269.4(1.2)	3.0(0.4)	23.8(1.3)	65.8(1.5)	34.2(1.5)
	1990	2569	3.2(0.1) [3%]	267.3(1.2)	2.9(0.6)	20.6(1.2)	63.2(1.6)	36.8(1.6)
Iowa	1992	2816	1.4(0.1) [4%]	282.8(1.0)>	4.7(0.7)	37.2(1.4)>	81.3(1.2)>	18.7(1.2)<
	1990	2474	1.5(0.1) [4%]	278.0(1.1)	3.8(0.5)	30.4(1.5)	76.3(1.1)	23.7(1.1)
Kentucky	1992	2756	1.8(0.1) [3%]	261.4(1.1)>	1.9(0.4)	16.7(1.1)	57.3(1.3)>	42.7(1.3)<
	1990	2680	2.1(0.1) [4%]	257.1(1.2)	1.2(0.2)	13.5(0.9)	50.5(1.8)	49.5(1.8)
Louisiana	1992	2582	1.9(0.1) [4%]	249.1(1.7)	0.5(0.2)	9.6(1.2)	42.4(2.0)	57.6(2.0)
	1990	2572	2.2(0.1) [4%]	246.4(1.2)	0.6(0.2)	7.6(1.0)	38.6(1.7)	61.4(1.7)
Maine	1992	2464	0.6(0.0) [2%]	278.0(1.0)	3.7(0.6)	30.8(1.9)	77.5(1.3)	22.5(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Maryland	1992	2399	1.9(0.1) [3%]	264.2(1.3)	3.7(0.6)	23.8(1.3)	58.7(1.5)	41.3(1.5)
	1990	2794	2.2(0.0) [2%]	260.8(1.4)	3.1(0.6)	19.9(1.2)	55.8(1.7)	44.2(1.7)
Massachusetts	1992	2456	2.1(0.1) [4%]	272.1(1.1)	3.3(0.5)	27.9(1.4)	67.9(1.5)	32.1(1.5)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Michigan	1992	2616	4.2(0.1) [2%]	266.6(1.4)	2.6(0.5)	23.1(1.7)	63.2(1.6)	36.8(1.6)
	1990	2587	4.8(0.1) [3%]	264.4(1.2)	2.4(0.4)	19.7(1.4)	60.3(1.4)	39.7(1.4)
Minnesota	1992	2471	2.0(0.1) [2%]	281.8(1.0)>	5.6(0.7)>	36.7(1.2)>	78.5(1.2)>	21.5(1.2)<
	1990	2584	2.4(0.1) [4%]	275.4(0.9)	3.7(0.4)	28.7(1.2)	73.9(1.3)	26.1(1.3)
Mississippi	1992	2498	1.4(0.0) [3%]	245.5(1.2)	0.5(0.2)	8.5(0.8)	38.3(1.5)	61.7(1.5)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Missouri	1992	2666	2.2(0.0) [2%]	270.4(1.2)	2.7(0.4)	23.7(1.3)	67.9(1.6)	32.1(1.6)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

(continued)

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Table K-9 (continued)

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Original Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Nebraska	1992	2285	0.8(0.0) [3%]	277.0(1.1)	3.6(0.5)	31.7(1.9)	75.4(1.2)	24.6(1.2)
	1990	2519	0.9(0.0) [2%]	275.7(1.0)	3.6(0.6)	29.9(1.4)	74.3(1.1)	25.7(1.1)
New Hampshire	1992	2535	0.5(0.0) [2%]	277.6(1.0)>	3.5(0.6)	30.0(1.5)>	76.8(1.0)>	23.2(1.0)<
	1990	2568	0.5(0.0) [1%]	273.1(0.9)	3.2(0.5)	25.0(1.2)	71.3(1.6)	28.7(1.6)
New Kersey	1992	2174	3.2(0.1) [4%]	271.2(1.6)	3.9(0.6)	27.6(1.4)	67.3(1.8)	32.7(1.8)
	1990	2710	3.5(0.1) [4%]	269.7(1.1)	3.9(0.5)	25.3(1.3)	64.5(1.6)	35.5(1.6)
New Mexico	1992	2561	0.8(0.0) [1%]	258.8(0.9)>	1.1(0.3)	13.8(1.0)	54.1(1.4)	45.9(1.4)
	1990	2643	0.8(0.0) [1%]	256.4(0.7)	1.2(0.3)	12.8(0.9)	50.7(1.3)	49.3(1.3)
New York	1992	2158	6.5(0.2) [3%]	265.7(2.1)	3.7(0.6)	23.8(1.6)>	62.5(2.3)	37.5(2.3)
	1990	2302	7.7(0.2) [2%]	260.8(1.4)	3.1(0.5)	18.8(1.0)	56.5(1.7)	43.5(1.7)
North Carolina	1992	2769	3.2(0.1) [3%]	257.6(1.2)>	1.5(0.3)	15.2(1.0)>	52.8(1.5)>	47.2(1.5)<
	1990	2843	3.6(0.1) [2%]	250.3(1.1)	0.8(0.4)	11.3(0.8)	44.4(1.4)	55.6(1.4)
North Dakota	1992	2314	0.3(0.0) [3%]	282.6(1.2)	3.8(0.6)	35.7(1.7)	82.4(1.3)	17.6(1.3)
	1990	2485	0.4(0.0) [4%]	281.1(1.2)	3.9(0.6)	33.8(2.0)	81.0(1.6)	19.0(1.6)
Ohio	1992	2535	5.4(0.2) [4%]	267.4(1.5)	2.4(0.5)	22.4(1.4)	64.3(2.0)	35.7(2.0)
	1990	2673	5.6(0.1) [2%]	264.0(1.0)	2.0(0.3)	18.5(1.2)	59.6(1.4)	40.4(1.4)
Oklahoma	1992	2141	1.5(0.0) [3%]	267.4(1.2)>	1.5(0.3)	21.1(1.2)>	65.2(2.0)	34.8(2.0)
	1990	2222	1.8(0.0) [2%]	263.2(1.3)	1.6(0.5)	16.9(1.3)	59.2(1.6)	40.8(1.6)
Pennsylvania	1992	2612	4.5(0.1) [3%]	270.7(1.5)	3.2(0.7)	25.9(1.5)	67.2(1.7)	32.8(1.7)
	1990	2528	5.4(0.2) [3%]	266.4(1.6)	2.3(0.4)	21.4(1.5)	62.9(2.0)	37.1(2.0)
Rhode Island	1992	2120	0.4(0.0) [0%]	265.1(0.7)>	1.8(0.3)	19.7(1.3)	62.0(1.2)>	38.0(1.2)<
	1990	2675	0.4(0.0) [2%]	260.0(0.6)	1.8(0.3)	18.3(1.0)	54.9(0.9)	45.1(0.9)
South Carolina	1992	2625	1.8(0.0) [2%]	260.0(1.0)	2.1(0.5)	18.0(1.1)	53.4(1.2)	46.6(1.2)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Tennessee	1992	2485	2.3(0.1) [3%]	258.0(1.4)	1.2(0.4)	14.7(1.2)	52.6(1.8)	47.4(1.8)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Texas	1992	2614	8.8(0.3) [3%]	263.8(1.3)>	3.6(0.6)	21.2(1.4)>	57.8(1.5)>	42.2(1.5)<
	1990	2542	10.2(0.3) [3%]	258.2(1.4)	2.0(0.4)	15.9(1.0)	52.0(1.7)	48.0(1.7)
Utah	1992	2726	1.2(0.0) [3%]	273.6(0.7)	2.7(0.5)	27.2(1.1)	72.1(1.3)	27.9(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Virginia	1992	2710	2.8(0.1) [4%]	267.1(1.2)	3.2(0.5)	22.9(1.2)	62.3(1.6)	37.7(1.6)
	1990	2661	3.0(0.1) [3%]	264.3(1.5)	4.1(0.8)	20.7(1.6)	57.7(1.6)	42.3(1.6)
West Virginia	1992	2690	0.9(0.0) [3%]	258.2(1.0)	0.7(0.2)	12.6(0.9)	52.9(1.5)	47.1(1.5)
	1990	2600	1.1(0.0) [3%]	255.9(1.0)	1.1(0.2)	12.1(0.9)	49.3(1.2)	50.7(1.2)
Wisconsin	1992	2814	2.3(0.1) [6%]	277.3(1.5)	3.9(0.6)	32.1(1.4)	75.6(1.9)	24.4(1.9)
	1990	2750	2.4(0.1) [3%]	274.5(1.3)	3.6(0.5)	28.8(1.5)	72.3(1.7)	27.7(1.7)
Wyoming	1992	2444	0.3(0.0) [2%]	274.4(0.9)>	2.4(0.5)	25.8(1.0)	73.0(1.3)	27.0(1.3)
	1990	2701	0.3(0.0) [1%]	272.1(0.7)	2.0(0.3)	23.6(1.0)	71.1(1.3)	28.9(1.3)
Guam	1992	1496	0.1(0.0) [1%]	234.3(1.0)>	0.6(0.2)	7.0(0.7)	29.5(1.4)	70.5(1.4)
	1990	1617	0.1(0.0) [0%]	231.8(0.7)	0.5(0.2)	5.2(0.6)	26.7(1.0)	73.3(1.0)
Virgin Islands	1992	1479	0.1(0.0) [0%]	221.8(1.1)>	0.0(0.1)	0.9(0.3)	12.7(1.0)	87.3(1.0)
	1990	1326	0.1(0.0) [0%]	218.7(0.9)	0.1(0.1)	0.9(0.4)	10.4(1.1)	89.6(1.1)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

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Table K-10

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Alabama	1992	2522	2.0(0.1) [3%]	252.2(1.7)	0.9(0.3)	10.2(0.9)	38.8(1.9)	61.2(1.9)
	1990	2531	2.2(0.1) [3%]	252.9(1.1)	1.0(0.2)	9.1(0.7)	40.3(1.7)	59.7(1.7)
Arizona	1992	2617	1.7(0.1) [4%]	265.4(1.3)>	1.4(0.3)	15.1(1.3)	54.7(1.8)>	45.3(1.8)<
	1990	2558	1.8(0.1) [3%]	259.6(1.3)	1.3(0.4)	12.7(0.9)	47.5(1.8)	52.5(1.8)
Arkansas	1992	2556	1.2(0.0) [2%]	256.3(1.2)	0.7(0.2)	10.0(0.8)	44.3(1.8)	55.7(1.8)
	1990	2669	1.5(0.0) [2%]	256.2(0.9)	0.7(0.2)	9.3(0.7)	43.9(1.2)	56.1(1.2)
California	1992	2516	12.5(0.3) [3%]	260.9(1.7)>	2.2(0.7)	16.2(1.3)	50.4(1.9)	49.6(1.9)
	1990	2424	14.2(0.4) [3%]	256.3(1.3)	1.7(0.3)	12.5(1.1)	44.6(1.7)	55.4(1.7)
Colorado	1992	2799	1.6(0.0) [2%]	272.4(1.0)>	2.1(0.4)	21.6(1.2)>	63.9(1.4)>	36.1(1.4)<
	1990	2675	1.7(0.0) [2%]	267.4(0.9)	1.9(0.4)	16.9(1.0)	57.5(1.2)	42.5(1.2)
Connecticut	1992	2613	1.2(0.0) [3%]	273.7(1.1)>	3.2(0.6)	25.7(1.1)>	64.4(1.4)	35.6(1.4)
	1990	2672	1.4(0.0) [3%]	269.9(1.0)	3.4(0.4)	21.7(0.9)	59.9(1.4)	40.1(1.4)
Delaware	1992	1934	0.3(0.0) [0%]	262.9(1.0)	2.3(0.4)	15.1(1.0)	51.6(1.2)	48.4(1.2)
	1990	2110	0.3(0.0) [0%]	260.7(0.9)	1.9(0.4)	14.2(0.8)	47.8(1.5)	52.2(1.5)
Dist of Columbia	1992	1816	0.2(0.0) [0%]	234.9(0.9)>	0.6(0.2)	4.4(0.9)	21.8(1.1)>	78.2(1.1)<
	1990	2135	0.2(0.0) [0%]	231.4(0.9)	0.8(0.2)	3.1(0.6)	16.6(1.0)	83.4(1.0)
Florida	1992	2549	4.6(0.2) [3%]	259.9(1.5)>	1.5(0.3)	14.6(1.2)	48.8(1.9)>	51.2(1.9)<
	1990	2534	5.5(0.2) [3%]	255.3(1.2)	1.4(0.3)	12.0(0.9)	42.7(1.4)	57.3(1.4)
Georgia	1992	2589	3.1(0.1) [4%]	259.4(1.2)	1.1(0.3)<	12.7(0.9)	47.9(1.7)	52.1(1.7)
	1990	2766	3.7(0.1) [4%]	258.8(1.3)	2.4(0.4)	13.8(1.2)	47.2(1.5)	52.8(1.5)
Hawaii	1992	2454	0.5(0.0) [0%]	257.4(0.9)>	1.8(0.3)	13.5(0.7)	46.2(1.1)>	53.8(1.1)<
	1990	2551	0.5(0.0) [0%]	251.0(0.8)	1.6(0.3)	11.7(0.7)	40.0(1.0)	60.0(1.0)
Idaho	1992	2615	0.7(0.0) [2%]	275.1(0.7)>	2.1(0.3)	21.7(1.2)	67.9(1.0)>	32.1(1.0)<
	1990	2716	0.8(0.0) [1%]	271.4(0.8)	1.2(0.3)	17.9(1.1)	63.4(1.2)	36.6(1.2)
Indiana	1992	2659	3.0(0.1) [3%]	270.1(1.1)	2.6(0.4)	19.7(1.2)	59.9(1.5)	40.1(1.5)
	1990	2569	3.2(0.1) [3%]	267.3(1.2)	2.5(0.5)	16.6(1.1)	56.4(1.5)	43.6(1.5)
Iowa	1992	2816	1.4(0.1) [4%]	283.4(1.0)>	3.9(0.7)	31.2(1.3)>	76.4(1.3)>	23.6(1.3)<
	1990	2474	1.5(0.1) [4%]	278.0(1.1)	3.3(0.5)	25.1(1.4)	70.0(1.2)	30.0(1.2)
Kentucky	1992	2756	1.8(0.1) [3%]	262.2(1.1)>	1.6(0.3)	13.8(1.1)>	51.2(1.5)>	48.8(1.5)<
	1990	2680	2.1(0.1) [4%]	257.1(1.2)	1.1(0.3)	10.5(0.8)	43.0(1.7)	57.0(1.7)
Louisiana	1992	2582	1.9(0.1) [4%]	250.0(1.7)	0.5(0.2)	7.2(1.0)	36.6(1.9)	63.4(1.9)
	1990	2572	2.2(0.1) [4%]	246.4(1.2)	0.5(0.2)	5.4(0.6)	31.7(1.6)	68.3(1.6)
Maine	1992	2464	0.6(0.0) [2%]	278.6(1.0)	3.1(0.6)	25.5(1.5)	71.6(1.3)	28.4(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Maryland	1992	2399	1.9(0.1) [3%]	264.8(1.3)>	3.2(0.5)	19.9(1.2)	53.9(1.4)	46.1(1.4)
	1990	2794	2.2(0.0) [2%]	260.8(1.4)	2.6(0.5)	16.6(1.2)	49.7(1.6)	50.3(1.6)
Massachusetts	1992	2456	2.1(0.1) [4%]	272.8(1.0)	2.8(0.5)	23.3(1.3)	62.8(1.5)	37.2(1.5)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Michigan	1992	2616	4.2(0.1) [2%]	267.4(1.4)	2.2(0.4)	18.9(1.5)	57.9(1.7)	42.1(1.7)
	1990	2587	4.8(0.1) [3%]	264.4(1.2)	2.1(0.4)	15.8(1.2)	53.3(1.7)	46.7(1.7)
Minnesota	1992	2471	2.0(0.1) [2%]	282.4(1.0)>	4.7(0.6)	31.1(1.2)>	74.2(1.3)>	25.8(1.3)<
	1990	2584	2.4(0.1) [4%]	275.4(0.9)	3.3(0.5)	23.3(1.2)	67.5(1.1)	32.5(1.1)
Mississippi	1992	2498	1.4(0.0) [3%]	246.5(1.2)	0.3(0.1)	6.4(0.7)	33.4(1.6)	66.6(1.6)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Missouri	1992	2666	2.2(0.0) [2%]	271.1(1.2)	2.3(0.4)	19.5(1.2)	62.5(1.6)	37.5(1.6)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)

> INDICATES A SIGNIFICANT INCREASE (OR DECREASE "<") BETWEEN 1990 AND 1992

(continued)

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Table K-10 (continued)

NAEP 1992 Trial State Assessment in Mathematics
Grade 8 Weighted Percentages and Composite Scale Means
Percent of Students At or Above the Achievement Levels
Revised Results

		N	WEIGHTED PCT [CV]	MEAN	ADVANCED	PRFCIENT	BASIC	< BASIC
Nebraska	1992	2285	0.8(0.0) [3%]	277.7(1.1)	2.9(0.5)	26.3(1.6)	70.2(1.3)	29.8(1.3)
	1990	2519	0.9(0.0) [2%]	275.7(1.0)	3.3(0.5)	24.4(1.2)	68.2(1.3)	31.8(1.3)
New Hampshire	1992	2535	0.5(0.0) [2%]	278.2(1.0)>	2.8(0.5)	24.9(1.4)>	71.2(1.3)>	28.8(1.3)<
	1990	2568	0.5(0.0) [1%]	273.1(0.9)	2.7(0.5)	20.3(1.2)	64.7(1.5)	35.3(1.5)
New Jersey	1992	2174	3.2(0.1) [4%]	271.9(1.6)	3.2(0.4)	23.7(1.3)	62.5(1.9)	37.5(1.9)
	1990	2710	3.5(0.1) [4%]	269.7(1.1)	3.4(0.5)	21.3(1.1)	58.2(1.5)	41.8(1.5)
New Mexico	1992	2561	0.8(0.0) [1%]	259.6(0.9)>	0.9(0.3)	10.9(0.8)	47.6(1.3)>	52.4(1.3)<
	1990	2643	0.8(0.0) [1%]	256.4(0.7)	1.0(0.3)	10.2(0.9)	43.2(1.2)	56.8(1.2)
New York	1992	2158	6.5(0.2) [3%]	266.4(2.1)>	3.2(0.5)	20.0(1.3)>	57.5(2.2)>	42.5(2.2)<
	1990	2302	7.7(0.2) [2%]	260.8(1.4)	2.7(0.4)	15.3(0.9)	49.9(1.7)	50.1(1.7)
North Carolina	1992	2769	3.2(0.1) [3%]	258.4(1.2)>	1.2(0.3)	12.1(1.0)>	47.0(1.4)>	53.0(1.4)<
	1990	2843	3.6(0.1) [2%]	250.3(1.1)	0.6(0.3)	8.7(0.7)	37.9(1.4)	62.1(1.4)
North Dakota	1992	2314	0.3(0.0) [3%]	283.2(1.1)	3.1(0.5)	29.5(1.6)	77.9(1.4)	22.1(1.4)
	1990	2485	0.4(0.0) [4%]	281.1(1.2)	3.6(0.6)	27.3(1.8)	75.4(1.6)	24.6(1.6)
Ohio	1992	2535	5.4(0.2) [4%]	268.1(1.5)>	1.9(0.4)	18.1(1.3)	58.8(2.1)	41.2(2.1)
	1990	2673	5.6(0.1) [2%]	264.0(1.0)	1.7(0.3)	14.8(1.1)	52.6(1.6)	47.4(1.6)
Oklahoma	1992	2141	1.5(0.0) [3%]	268.1(1.1)>	1.1(0.3)	16.9(1.1)	59.4(1.6)>	40.6(1.6)<
	1990	2222	1.8(0.0) [2%]	263.2(1.3)	1.3(0.4)	13.3(1.2)	52.0(1.8)	48.0(1.8)
Pennsylvania	1992	2612	4.5(0.1) [3%]	271.4(1.5)>	2.7(0.5)	21.5(1.5)	62.1(1.7)	37.9(1.7)
	1990	2528	5.4(0.2) [3%]	266.4(1.6)	2.0(0.4)	17.2(1.3)	56.0(2.0)	44.0(2.0)
Rhode Island	1992	2120	0.4(0.0) [0%]	265.9(0.7)>	1.4(0.3)	15.7(1.1)	56.4(1.2)>	43.6(1.2)<
	1990	2675	0.4(0.0) [2%]	260.0(0.6)	1.6(0.3)	14.5(0.7)	48.8(1.0)	51.2(1.0)
South Carolina	1992	2625	1.8(0.0) [2%]	260.8(1.0)	1.7(0.5)	14.9(1.0)	47.8(1.3)	52.2(1.3)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Tennessee	1992	2485	2.3(0.1) [3%]	258.8(1.4)	1.0(0.4)	11.6(1.0)	46.8(1.9)	53.2(1.9)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Texas	1992	2614	8.8(0.3) [3%]	264.6(1.3)>	3.2(0.6)	18.1(1.2)>	52.7(1.5)>	47.3(1.5)<
	1990	2542	10.2(0.3) [3%]	258.2(1.4)	1.6(0.3)	12.7(1.1)	45.5(1.6)	54.5(1.6)
Utah	1992	2726	1.2(0.0) [3%]	274.3(0.7)	2.3(0.4)	22.3(1.0)	66.8(1.2)	33.2(1.2)
	1990	0	0.0(0.0) [0%]	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)	*****(0.0)
Virginia	1992	2710	2.8(0.1) [4%]	267.9(1.2)	2.7(0.6)	19.2(1.1)	56.7(1.7)	43.3(1.7)
	1990	2661	3.0(0.1) [3%]	264.3(1.5)	3.7(0.8)	17.3(1.6)	51.6(1.7)	48.4(1.7)
West Virginia	1992	2690	0.9(0.0) [3%]	259.1(1.0)>	0.6(0.2)	9.8(0.8)	46.8(1.6)>	53.2(1.6)<
	1990	2600	1.1(0.0) [3%]	255.9(1.0)	0.9(0.2)	9.3(0.8)	41.8(1.1)	58.2(1.1)
Wisconsin	1992	2814	2.3(0.1) [6%]	277.9(1.5)	3.2(0.6)	27.0(1.4)	70.8(2.1)	29.2(2.1)
	1990	2750	2.4(0.1) [3%]	274.5(1.3)	3.1(0.4)	23.2(1.4)	65.7(1.6)	34.3(1.6)
Wyoming	1992	2444	0.3(0.0) [2%]	275.1(0.9)>	1.9(0.4)	21.0(1.1)	67.2(1.3)	32.8(1.3)
	1990	2701	0.3(0.0) [1%]	272.1(0.7)	1.7(0.2)	18.5(0.9)	63.7(1.3)	36.3(1.3)
Guam	1992	1496	0.1(0.0) [1%]	235.1(1.0)>	0.5(0.1)	5.6(0.6)>	25.3(1.4)	74.7(1.4)
	1990	1617	0.1(0.0) [0%]	231.8(0.7)	0.4(0.2)	3.8(0.4)	21.7(1.0)	78.3(1.0)
Virgin Islands	1992	1479	0.1(0.0) [0%]	222.8(1.1)>	0.0(0.1)	0.6(0.3)	9.4(0.9)	90.6(0.9)
	1990	1326	0.1(0.0) [0%]	218.7(0.9)	0.1(0.1)	0.7(0.3)	7.6(1.0)	92.4(1.0)

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REFERENCES CITED IN TEXT

Abedi, J. (1996). The Interrater/Test Reliability System (ITRS). *Multivariate Behavioral Research, 31(4)*, 409-417.

Allen, N. L. (1992). Data analysis for the science assessment. In E. G. Johnson & N. L. Allen, *The NAEP 1990 technical report* (No. 21-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Allen, N. L., & Donoghue, J. R. (1994, April). *Differential item functioning based on complex samples of dichotomous and polytomous items.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Allen, N. L., & Donoghue, J. R. (in press). Applying the Mantel-Haenszel procedure to complex samples of items. *Journal of Educational Measurement.*

Allen, N. L., & Isham, S. P. (1994). Data analysis for the science long-term trend assessment. In E. G. Johnson & J. E. Carlson, *The NAEP 1992 technical report.* Washington, DC: National Center for Education Statistics.

Allen, N. L., Jenkins, F., Kulick, E., & Zelenak, C. A. (1997). *Technical report of the NAEP 1996 state assessment program in mathematics* (Publication No. NCES 97-951). Washington, DC: National Center for Education Statistics.

Allen, N. L., Kline, D. L., & Zelenak, C. A. (1996). *The NAEP 1994 technical report* (Publication No. NCES 97-897). Washington, DC: National Center for Education Statistics.

Andersen, E. B. (1980). Comparing latent distributions. *Psychometrika, 45*, 121-134.

Angoff, W. H. (1971). Scales, norms, and equivalent scores. In R. L. Thorndike (Ed.), *Educational measurement* (2nd ed., pp. 508-600). Washington, DC: American Council on Education.

Ballator, N., Farnum, M., & Kaplan, B. (1999). *NAEP 1996 trends in writing: fluency and writing conventions* (Publication No. NCES 1999-456). Washington, DC: National Center for Education Statistics.

Beaton, A. E. (1987). *Implementing the new design: The NAEP 1983-84 technical report.* (No. 15-TR-20) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Beaton, A.E. (1988). *Expanding the new design: The NAEP 1985-86 technical report* (No. 17-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Beaton, A. E., & Johnson, E. G. (1990). The average response method of scaling. *Journal of Educational Statistics, 15*, 9-38.

Beaton, A. E., & Johnson, E. G. (1992). Overview of the scaling methodology used in the National Assessment. *Journal of Educational Measurement, 26(2)*, 163-175.

Beaton, A. E., & Zwick, R. (1990). *The effect of changes in the National Assessment: Disentangling the NAEP 1985-86 reading anomaly.* (No. 17-TR-21) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Benjamini, Y., & Hochberg, Y. (1994). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society, Series B, 57(1)*, 289-300.

Bock, R. D. (1972). Estimating item parameters and latent ability when responses are scored in two or more latent categories. *Psychometrika, 37*, 29-51.

Bourque, M. L., Champagne, A. B., & Crissman, S. (1997). *NAEP 1996 science performance standards: Achievement results for the nation and the states.* Washington, DC: National Assessment Governing Board.

Bourque, M. L., & Garrison, H. H. (1991). *The levels of mathematics achievement: Vol. I, national and state summaries.* Washington, DC: National Assessment Governing Board.

Calderone, J., King, L. M., & Horkay, N. (Eds.). (1997). *The NAEP guide: A description of the content and methods of the 1997 and 1998 assessments* (Publication No. NCES 97-990). Washington, DC: National Center for Education Statistics.

Campbell, J. R., Voelkl, K. E., & Donahue, P. L. (1997). *NAEP 1996 trends in academic progress: Achievement of U.S. students in science, 1969 to 1996; mathematics, 1973 to 1996; reading, 1971 to 1996; and writing, 1984 to 1996* (Publication No. NCES 97-985). Washington, DC: National Center for Education Statistics.

Carlson, J. E. (1993). *Dimensionality of NAEP instruments that incorporate polytomously-scored items.* Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA.

Carlson, J. E., & Jirele, T. (1992, April). *Dimensionality of 1990 NAEP mathematics data.* Paper presented at the meeting of the American Educational Research Association, San Francisco, CA.

Cochran, W. G. (1977). *Sampling techniques.* New York, NY: John Wiley & Sons.

Cohen, J. (1968). Weighted kappa: Nominal scale agreement with provision for scaled disagreement or partial credit. *Psychological Bulletin, 70*(4), 213-220.

Curry, L. (1987, April). *Group decision process in setting cut-off scores.* Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm (with discussion). *Journal of the Royal Statistical Society, Series B, 39*, 1-38.

Educational Testing Service. (1992). *Innovations and ingenuity: A foundation for the future. Application for cooperative agreement for NAEP* (CFDA Number: 84.999E). Princeton, NJ: Author.

Engelen, R. J. H. (1987). *Semiparametric estimation in the Rasch model.* Research Report 87-1. Twente, the Netherlands: Department of Education, University of Twente.

Fitzpatrick, A. R. (1989). Social influences in standard-setting: The effects of social interaction on group judgments. *Review of Educational Research, 59*, 315-328.

Friedman, C. B., & Ho, K. T. (1990, April). *Interjudge consensus and intrajudge consistency: Is it possible to have both on standard setting?* Paper presented at the annual meeting of the National Council for Measurement in Education, Boston, MA.

Hambleton, R. K., & Bourque, M. L. (1991). *The levels of mathematics achievement.* Vol. II, technical report. Washington, DC: National Assessment Governing Board.

Hawkins, E., Stancavage, F., & Dossey, J. A. (1998). *School policies affecting instruction in mathematics: Findings from the National Assessment of Educational Progress.* Washington, DC: National Center for Education Statistics.

Hochberg, Y. (1988). A sharper Bonferroni procedure for multiple tests of significance. *Biometrika, 75*, 800-802.

Hoijtink, H. (1991). *Estimating the parameters of linear models with a latent dependent variable by nonparametric maximum likelihood.* Research Bulletin HB-91-1040-EX. Groningen, The Netherlands: Psychological Institute, University of Groningen.

Holland, P. W., & Thayer, D. T. (1988). Differential item performance and the Mantel-Haenszel procedure. In H. Wainer & H. I. Braun (Eds.), *Test validity.* Hillsdale, NJ: Erlbaum.

Huynh, H. (1994). *Some technical aspects of standard setting.* Paper presented at the Joint Conference on Standard Setting for Large-Scale Assessments, Washington, D.C.

Huynh, H. (1998, October). On score locations of binary and partial credit items and their applications to item mapping and criterion-referenced interpretation. *Journal of Educational and Behavioral Statistics, 23*, 38-58.

Johnson, E. G. (1990). Data analysis for the writing assessment. In E. G Johnson & R. Zwick (Eds.), *Focusing the new design: the NAEP 1988 technical report* (pp. 267-296). Washington, DC: National Center for Education Statistics, Office of Educational Research and Improvement, U.S. Department of Education.

Johnson, E. G., & Allen, N. L. (1992). *The NAEP 1990 technical report* (No. 21-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Johnson, E. G., & Carlson, J. E. (1994). *The NAEP 1992 technical report.* Washington, DC: National Center for Education Statistics.

Johnson, E. G., & King, B. F. (1987). Generalized variance functions for a complex sample survey. *Journal of Official Statistics, 3*, 235-250.

Johnson, E. G., & Rust, K. F. (1992). Population inferences and variance estimation for NAEP data. *Journal of Educational Statistics, 17*, 175-190.

Johnson, E. G., & Rust, K. F. (1993). *Effective degrees of freedom for variance estimates from a complex sample survey.* Paper presented at the American Statistical Association 1993 Annual Meeting, San Francisco, CA.

Johnson, E. G., & Zwick, R. (1990). *Focusing the new design: The NAEP 1988 technical report.* (No. 19-TR-20) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Kaplan, B. A., Beaton, A. E., Johnson, E. G., & Johnson, J. R. (1988). *National Assessment of Educational Progress: 1986 Bridge Studies.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Kaplan, D. (1995). The impact of BIB spiraling-induced missing data patterns on goodness-of-fit tests in factor analysis. *Journal of Educational and Behavioral Statistics, 20,* 69-82.

Keiser, K. K., Nelson, J. E., Norris, N. A., & Szyszkiewicz, S. (1998). *NAEP 1996 science cross-state data compendium for the grade 8 assessment.* Washington, DC: National Center for Education Statistics.

Kish, L. (1965). *Survey sampling.* New York, NY: John Wiley & Sons.

Kish, L., & Frankel, M. R. (1974). Inference from complex samples. *Journal of the Royal Statistical Society, Series B, 36,* 1-22.

Koretz, D., Lewis, E., Skewes-Cox, T., & Burstein, L. (1993). *Omitted and not-reached items in mathematics in the 1990 National Assessment of Educational Progress.* CRESST Technical Report Number 357. Los Angeles, CA: CRESST.

Krewski, D., & Rao, J. N. K. (1981). Inference from stratified samples: Properties of linearization, jackknife and balanced repeated replication. *Annals of Statistics, 9,* 1010-1019.

Laird, N. M. (1978). Nonparametric maximum likelihood estimation of a mixing distribution. *Journal of the American Statistical Association, 73,* 805-811.

Lindsey, B., Clogg, C. C., & Grego, J. (1991). Semiparametric estimation in the Rasch model and related exponential response models, including a simple latent class model for item analysis. *Journal of the American Statistical Association, 86,* 96-107.

Little, R. J. A., & Rubin, D. B. (1983). On jointly estimating parameters and missing data. *American Statistician, 37,* 218-220.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data.* New York, NY: John Wiley & Sons.

Lord, F. M. (1980). *Applications of item response theory to practical testing problems.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Luecht, R. M. (1993, April). *Using IRT to improve the standard setting process for dichotomous and polytomous items.* Paper presented at the annual meeting of the National Council on Measurement in Education, Atlanta, GA.

Mantel, N. (1963). Chi-square tests with one degree of freedom: Extensions of the Mantel-Haenszel procedure. *Journal of the American Statistical Association, 58,* 690-700.

Mazzeo, J., Johnson, E. G., Bowker, D., & Fong, Y. F. (1992). *The use of collateral information in proficiency estimation for the Trial State Assessment.* Paper presented at the annual meeting of the American Educational Research Association, San Francisco, CA.

Messick, S. J., Beaton, A. E., & Lord, F. M. (1983). *NAEP reconsidered: A new design for a new era.* (NAEP Report 83-1) Princeton, NJ: Educational Testing Service.

Mislevy, R. J. (1985). Estimation of latent group effects. *Journal of the American Statistical Association, 80*, 993-997.

Mislevy, R. J. (1990). Scaling procedures. In E. G. Johnson and R. Zwick, *Focusing the new design: The NAEP 1988 technical report* (No. 19-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Mislevy, R. J. (1991). Randomization-based inference about latent variables from complex samples. *Psychometrika, 56*, 177-196.

Mislevy, R. J., Beaton, A. E., Kaplan, B., & Sheehan, K. M. (1992). Estimating population characteristics from sparse matrix samples of item responses. *Journal of Educational Measurement, 29*(2), 133-161.

Mislevy, R. J., & Bock, R. D. (1982). *BILOG: Item analysis and test scoring with binary logistic models* [Computer program]. Mooresville, IN: Scientific Software.

Mislevy, R. J., Johnson, E. G., & Muraki, E. (1992). Scaling procedures in NAEP. *Journal of Educational Statistics, 17*(2), 131-154.

Mislevy, R. J., & Sheehan, K. M. (1987). Marginal estimation procedures. In A. E. Beaton, *Implementing the new design: The NAEP 1983-84 technical report* (No. 15-TR-20). Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Mislevy, R. J., & Wu, P. K. (1988). *Inferring examinee ability when some item responses are missing* (ETS Research Report RR-88-48-ONR). Princeton, NJ: Educational Testing Service.

Mitchell, J. H., Hawkins, E. F., Jakwerth, P., Stancavage, F. B., & Dossey, J. A. (1999). *Student work and teacher practices in mathematics.* Washington, DC: National Center for Education Statistics.

Mitchell, J. H., Hawkins, E. F., Stancavage, F., & Dossey, J. A. (1999). *Estimation skills, mathematics-in-context, and advanced skills in mathematics.* Washington, DC: National Center for Education Statistics.

Muraki, E. (1992). A generalized partial credit model: Application of an EM algorithm. *Applied Psychological Measurement, 16*(2), 159-176.

Muraki, E. (1993). Information functions of the generalized partial credit model. *Applied Psychological Measurement, 17(4)*, 351-362.

Muraki, E., & Bock, R. D. (1991). *PARSCALE: Parameter scaling of rating data*. Chicago, IL: Scientific Software, Inc.

Muraki, E., & Bock, R. D. (1997). *PARSCALE: IRT item analysis and test scoring for rating-scale data.* Chicago, IL: Scientific Software International.

Muthén, B. (1991). *Issues in using NAEP mathematics items to study achievement dimensionality, within-grade differences, and across-grade growth.* Report presented to the Design and Analysis Committee for NAEP.

National Academy of Education. (1992). *Assessing student achievement in the states. The first report of the National Academy of Education Panel on the evaluation of the NAEP Trial State Assessment: 1990 Trial State Assessment.* Stanford, CA: Author.

National Academy of Education. (1993a). *Setting performance standards for student achievement.* Stanford, CA: Author.

National Academy of Education. (1993b). *The trial state assessment: prospects and realities.* Stanford, CA: Author.

National Assessment Governing Board. (1994). *Mathematics framework for the 1996 National Assessment of Educational Progress.* Washington, DC: National Assessment Governing Board.

National Assessment Governing Board. (1994). *Science framework for the 1996 National Assessment of Educational Progress.* Washington, DC: National Assessment Governing Board.

National Computer Systems. (1996). *Report of processing and professional activities.* Iowa City, IA: Author.

O'Reilly, P. E., Zelenak C. A., Rogers, A. M., & Kline, D. L. (1999). *NAEP 1996 state assessment program in mathematics secondary-use data files user guide.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

O'Reilly, P. E., Zelenak C. A., Rogers, A. M., & Kline, D. L. (1999). *NAEP 1996 state assessment program in science secondary-use data files user guide.* Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

O'Sullivan, C. Y., Jerry, L., Ballator, N., and Herr, F. (1997). *NAEP 1996 Science State Reports.* Washington, DC: National Center for Education Statistics.

O'Sullivan, C. Y., Reese, C. M., & Mazzeo, J. (1997). *NAEP 1996 science report card for the nation and the states: Findings from the National Assessment of Educational Progress* (Publication No. NCES 97-499). Washington, DC: National Center for Education Statistics.

O'Sullivan, C. Y. & Weiss, A. R. (1999*). Student work and teacher practices in science: A report on what student know and can do.* Washington, DC: National Center for Education Statistics.

O'Sullivan, C. Y., Weiss, A. R., & Askew, J. M. (1998). *Students learning science: A report on policies and practices in U.S. schools.* Washington, DC: National Center for Education Statistics.

Petersen, N. (1988). *DIF procedures for use in statistical analysis.* Internal memorandum.

Reese, C. M., Jerry, L., & Ballator, N. (1997). *NAEP 1996 mathematics state reports.* Washington, DC: National Center for Education Statistics.

Reese, C. M., Miller, K. E., Mazzeo, J., & Dossey, J. A. (1997). *NAEP 1996 mathematics report card for the nation and the states: Findings from the National Assessment of Educational Progress* (Publication No. NCES 97-488). Washington, DC: National Center for Education Statistics.

Rock, D. A. (1991, November). *Subscale dimensionality.* Paper presented at the meeting of the Design and Analysis Committee of the National Assessment of Educational Progress, Washington, DC.

Rogers, A. M., Kline, D. L., & Schoeps, T. L. (1999) *NAEP 1996 national assessment secondary-use data files user guide.* Washington, DC: National Center for Education Statistics.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys.* New York, NY: John Wiley & Sons.

Rubin, D. B. (1991). EM and beyond. *Psychometrika, 56,* 241-254.

Rust, K. (1985). Variance estimation for complex estimators in sample surveys. *Journal of Official Statistics, 1*(4), 381-397.

Rust, K. F., Bethel, J., Burke, J., & Hansen, M. H. (1990). *The 1988 National Assessment of Educational Progress: Sampling and weighting procedures, final report.* Rockville, MD: Westat, Inc.

Rust, K. F., Burke, J., & Fahimi, M. (1992). *1990 National Assessment of Educational Progress sampling and weighting procedures, part 2: National assessment, final report.* Rockville, MD: Westat, Inc.

Satterthwaite, F. E. (1941). Synthesis of variance. *Psychometrika, 6,* 309-316.

Shaffer, J.P.(1994). *Multiple hypothesis testing: A review* (Tech. Rep. No. 23). Research Triangle Park, NC: National Institute of Statistical Sciences.

Sheehan, K. M. (1985). *MGROUP: Estimation of group effects in multivariate models* [Computer program]. Princeton, NJ: Educational Testing Service.

Shaughnessy, C.A., Nelson, J.E., & Norris, N.A. (1997). *NAEP 1996 mathematics cross-state data compendium for the grade 4 and grade 8 assessment.* Washington, DC: National Center for Education Statistics.

Smith, R. L., & Smith, J. K. (1988). Differential use of item information by judges using Angoff and Nedelsky procedures. *Journal of Educational Measurement, 25,* 259-274.

Somes, G. W. (1986). The generalized Mantel-Haenszel statistic. *The American Statistician, 40,* 106-108.

Stone, C. A., Mislevy, R. J., & Mazzeo, J. (1994, April). *Misclassification error and goodness-of-fit in IRT models.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

Tanner, M., & Wong, W. (1987). The calculation of posterior distributions by data augmentation (with discussion). *Journal of the American Statistical Association, 82,* 528-550.

Thomas, N. (1993). Asymptotic corrections for multivariate posterior moments with factored likelihood functions. *Journal of Computational and Graphical Statistics, 2,* 309-322.

Wainer, H., & Kiely, G. (1987). Item clusters and computerized adaptive testing: A case for testlets. *Journal of Educational Measurement, 24,* 185-202.

Wallace, L., & Rust, K. (1999) *The 1996 NAEP Sampling and Weighting Report.* Rockville, MD: Westat, Inc.

Westat, Inc. (1996). *Report on data collection activities for the 1996 National Assessment of Educational Progress*. Rockville, MD: Author.

Winer, B.J. (1962/1971). *Statistical Principles in Experimental Design*. (2nd ed.). New York: McGraw-Hill, Inc.

Wingersky, M., Kaplan, B. A., & Beaton, A. E. (1987). Joint estimation procedures. In A. E. Beaton, *Implementing the new design: The NAEP 1983-84 technical report* (pp. 285-292). (No. 15-TR-20) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Wolter, K. M. (1985). *Introduction to variance estimation*. New York, NY: John Wiley & Sons.

Yamamoto, K. (1988). Science data analysis. In A. E. Beaton, *Expanding the new design: The NAEP 1985-86 technical report* (pp. 243-255). (No. 17-TR-20) Princeton, NJ: Educational Testing Service, National Assessment of Educational Progress.

Zieky, M. (1993). Practical questions in the use of DIF statistics. In P. W. Holland & H. Wainer (Eds.), *Differential item functioning*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Zwick, R. (1986). *Assessment of the dimensionality of NAEP year 15 reading data*. (ETS Research Report No. 86-4). Princeton, NJ: Educational Testing Service.

Zwick, R. (1987). Assessing the dimensionality of NAEP reading data. *Journal of Educational Measurement, 24*, 293-308.

Zwick, R. (1988). *Professionally scored items*. Technical memorandum.

Zwick, R., Donoghue, J. R., & Grima, A. (1993). Assessment of differential item functioning for performance tasks. *Journal of Educational Measurement, 30*, 233-251.

Zwick, R., & Grima, A. (1991). *Policy for differential item functioning (DIF) analysis in NAEP*. Technical memorandum.

Zwinderman, A. H. (1991). Logistic regression Rasch models. *Psychometrika, 56*, 589-600.

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